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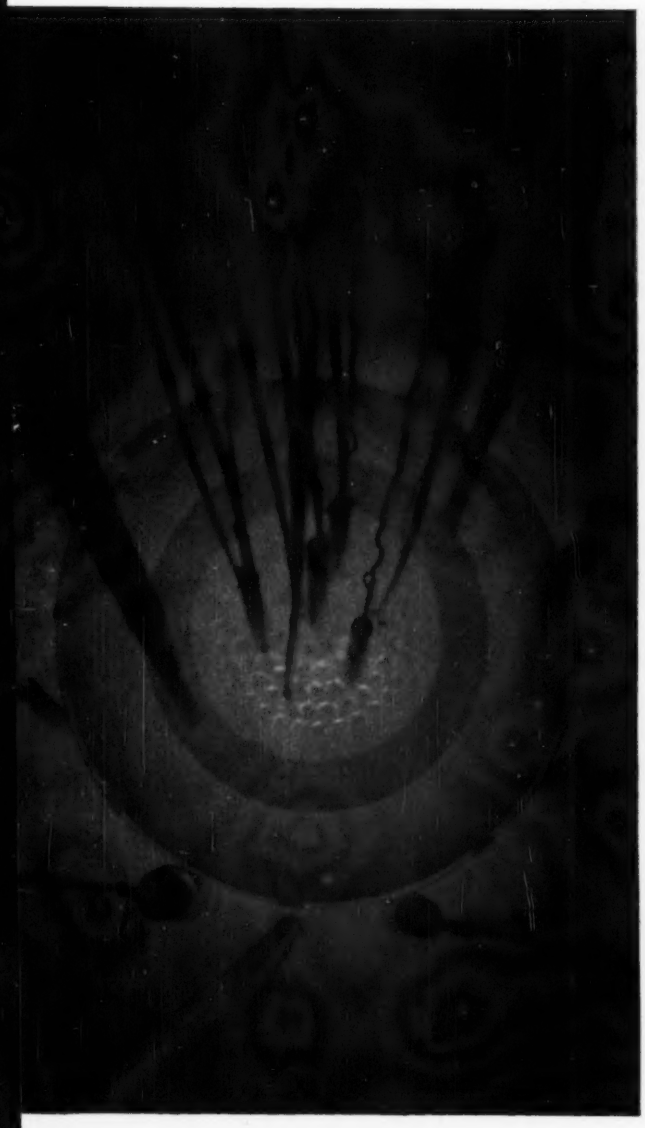
Chemical Week



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April 16, 1960

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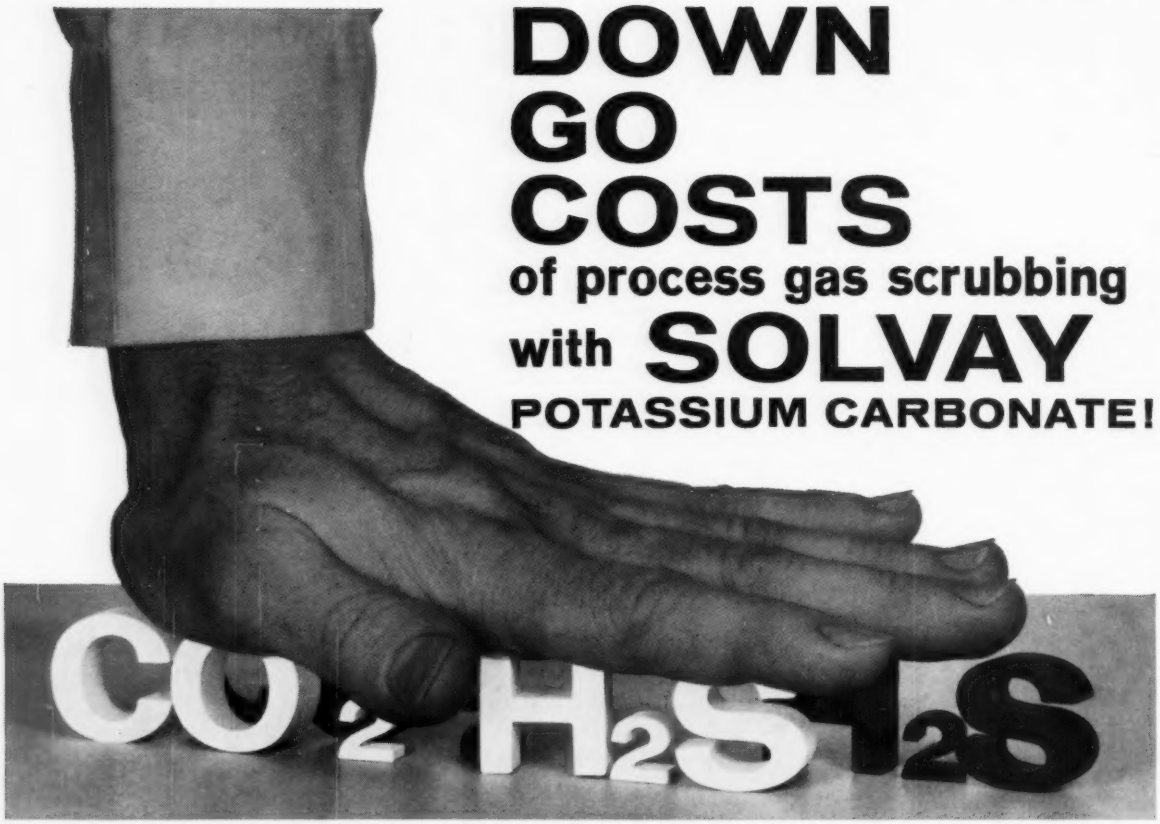

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Ask about these new standards of cleanness and their possible application to your problems. This exclusive service may save you important money. Dow Industrial Service offers the cleaning services formerly provided by Dowell. For engineered recommendations or more information, call the office or station near you. Or write Dow Industrial Service, 20575 Center Ridge Road, Cleveland 16, Ohio.

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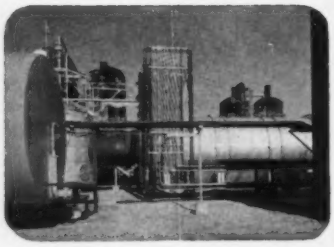

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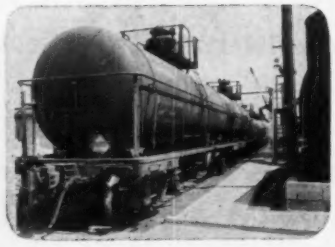

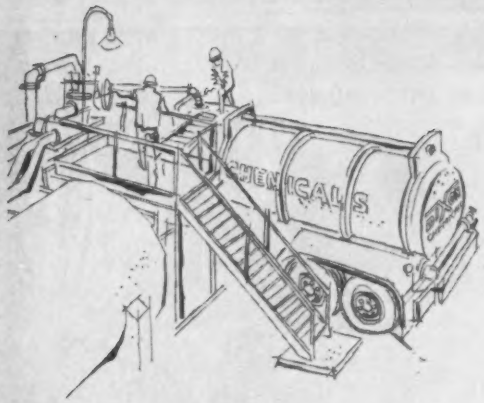

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Chemical Week

TOP OF THE WEEK

April 16, 1960

Behind Industrial Rayon's bid for Texas Butadiene: new products, new projects to broaden IR's base .....**p. 24**

Preventive safety—how Du Pont safety program is designed to spot accident areas before trouble starts .....**p. 45**

Latest aerosol formulation twist—quick-breaking foams. Here's where they'll fit into the aerosol picture .....**p. 63**

Trouble for tall-oil producers—overcapacity, dwindling exports force bold market development programs .....**p. 111**

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23 More on East Germany: *CW* interview with chemical industry chief.

24 New products and projects bolster Texas Butadiene's attractiveness to Industrial Rayon.

24 Pitt Coke's corporate revamping: new chemical and cement subsidiaries organized, new plants slated.

25 Delegates swarm, technical papers abound, as ACS tries out extended meeting plan at Cleveland.

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COVER PHOTO COURTESY GENERAL DYNAMICS CORP.

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What you should know about the economics of Reynolds Aluminum Process Pipe

Reynolds Aluminum Process Pipe—strong, lightweight, and corrosion-resistant—costs no more than cold rolled black steel or galvanized steel pipe, when you consider the total installed cost. For example, the table below shows that the base price of Reynolds Aluminum Heavy-End Pipe is almost as low as galvanized steel. Shipping and installation costs for aluminum pipe are invariably lower than heavier pipe—usually from 15 to 30% less.

PIPE COSTS COMPARED

4" Schedule 40 Pipe (Plain End) 100 feet	*Carload Price	Freight to West Texas from Eastern U.S.	Total
Black Steel	98.37	15.86	114.23
Galvanized Steel	117.72	15.86	133.58
Aluminum Heavy End* Alloy 6063-T6	143.75	—(1)	143.75
Aluminum Alloy 6063-T6	179.15	—(1)	179.15
Stainless Steel 304 Schd. 10	621.77	15.86	637.63
Stainless Steel 304 Schd. 40	1065.80	15.86	1081.66

*Quoted as of March 25,1960 (1) Aluminum prices include delivery charges

The table also shows that aluminum pipe is the lowest-cost corrosion-resistant pipe you can buy. Reynolds Aluminum Heavy End Pipe costs about 1/4 as much as stainless 304, Schedule 10, and about 1/7 as much as stainless 304, Schedule 40.

RESISTS CORROSION, WON'T RUST OR CONTAMINATE

The list of corrosive chemicals and process products that aluminum can handle is a long one, and it includes fluids that rapidly corrode other metals. Corrosion-resisting aluminum is ideal for process operations in the chemical, food, beverage, soap, drug, petroleum and petrochemical industries.

LIGHTWEIGHT, BUT STRONG

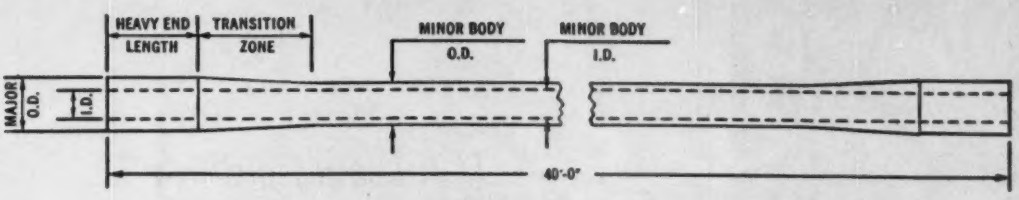
Only one-third as heavy as steel, Reynolds Aluminum Pipe costs less to handle, to ship, and to install. It requires less support, and is easier to move for temporary installations. Yet, aluminum is strong—strong enough to take rough handling and normal operating pressures. In fact, at lower temperatures (down to −320°F) where some metals grow brittle and weak, aluminum is actually *stronger*, with improved tensile and yield strengths, and ductility.

EASY TO WORK, WELD, JOIN

Aluminum is one of the easiest metals to form, bend, cut and join. It welds speedily and securely by any common welding method. You can choose from a large variety of forged and cast aluminum fittings, flanges and couplings for grooved, threaded, and welded joints. This means more design flexibility, lower installation costs. Other unique characteristics of aluminum pipe are also important: It is nonsparking, safer to use with volatiles. And, the smooth inside surface of Reynolds Aluminum Pipe means less danger of scale formation—you get improved product flow that can hold pumping costs down.

AVAILABILITY

Reynolds Aluminum Process Pipe is available in schedules 5, 10, 40 and 80. Diameters range from 1/8" to 12", and thicknesses range from .065" to .200". In addition, Reynolds Aluminum Pipe is available in both Duplex and Heavy-End types.



Reynolds Aluminum Heavy-End Pipe

REYNOLDS DUPLEX PIPE

Reynolds Duplex Pipe is actually a two-pipe steam trace system in one. A dividing wall inside the tube provides two separate channels—one for steam or condensate, the other for the viscuous product. Duplex eliminates an outside steam line and the cost of fastening the two pipes together, and it minimizes insulation needs.

HEAVY-END PIPE

Reynolds Aluminum Heavy-End Pipe can save up to 28% in piping costs. Heavy-End Pipe, with a constant inside diameter, is thicker at the ends to compensate for the loss in mechanical properties due to welding or grooving. Excess metal is eliminated in the pipe body and extra strength is provided where it's needed most—at the joint. It enables you to design a uniformly strong system without paying for extra metal, without overdesigning. Heavy-End Pipe is available in schedule 40 and 80 equivalents, and takes standard fittings.

REYNOLDS—FOR ALUMINUM PIPE, ALUMINUM KNOW-HOW

When designing any process system, plan for economy and long, efficient service; plan with Reynolds Aluminum Process Pipe. For details, contact your local Reynolds office, or write for complete file on the uses of aluminum in the chemical process industry. Use coupon below.

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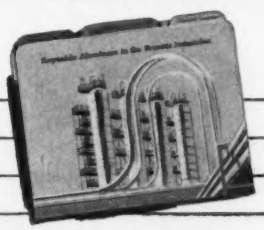

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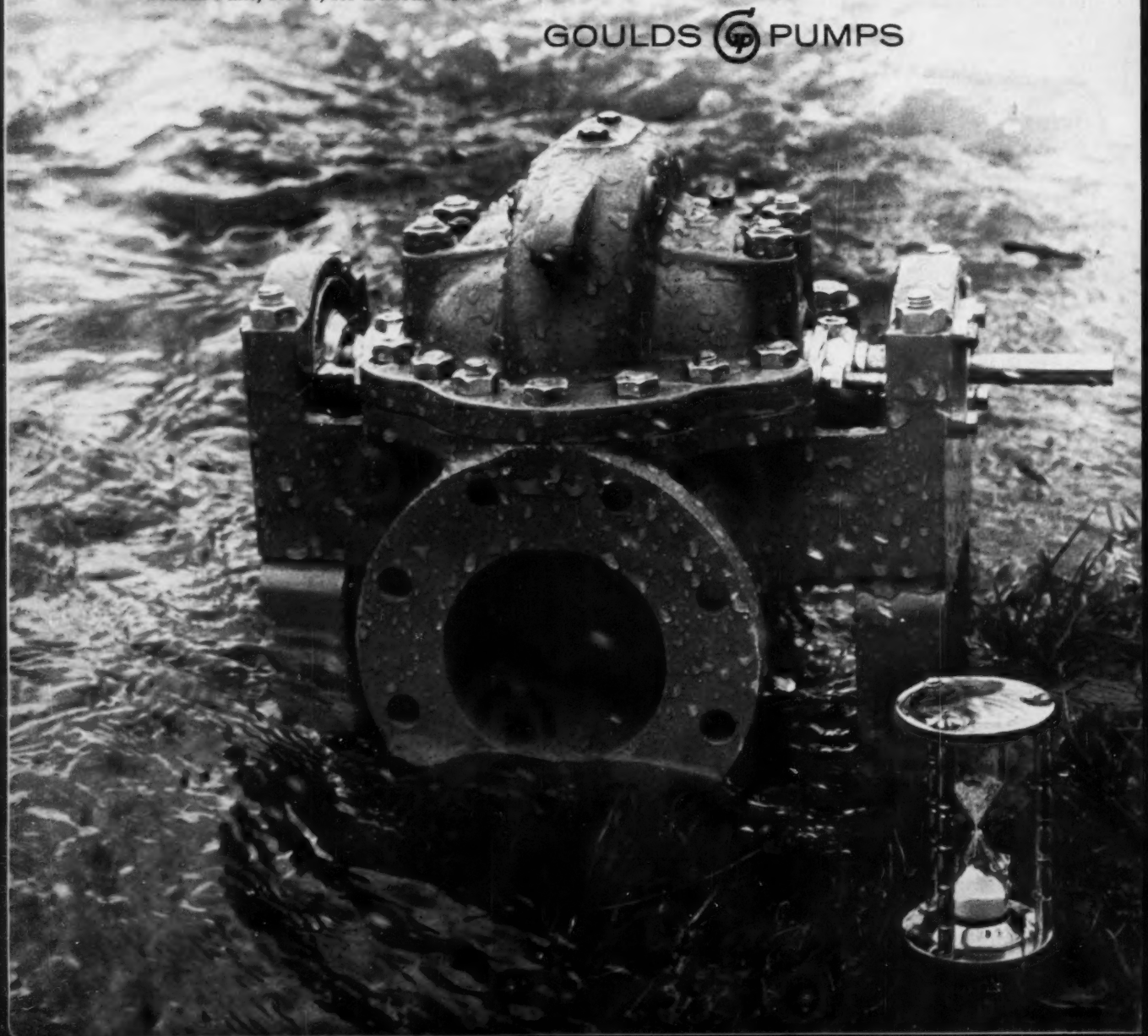

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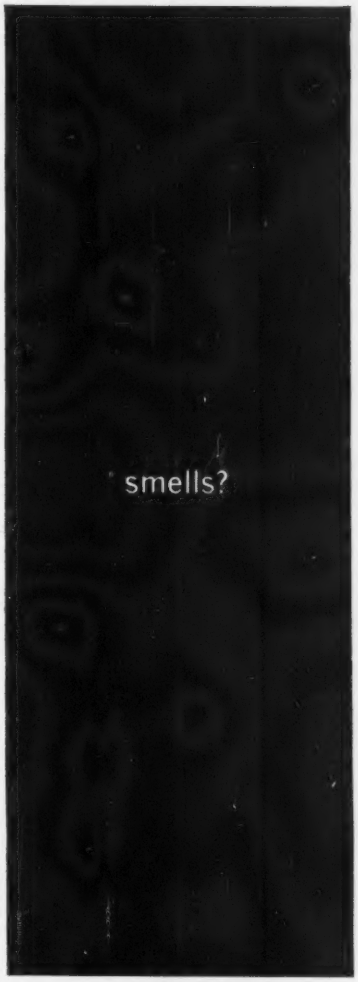

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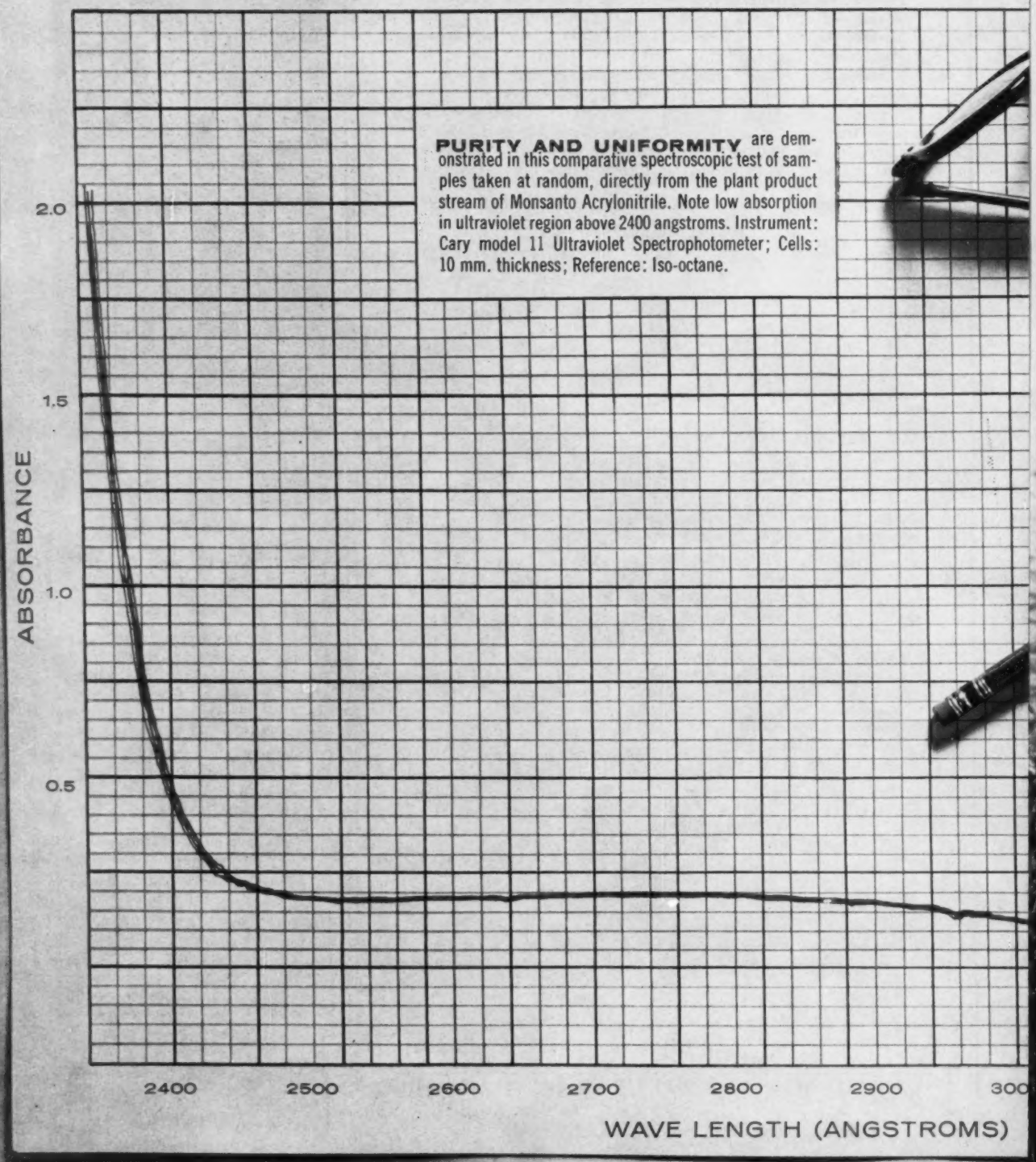
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1.0
0.5
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2600
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2900
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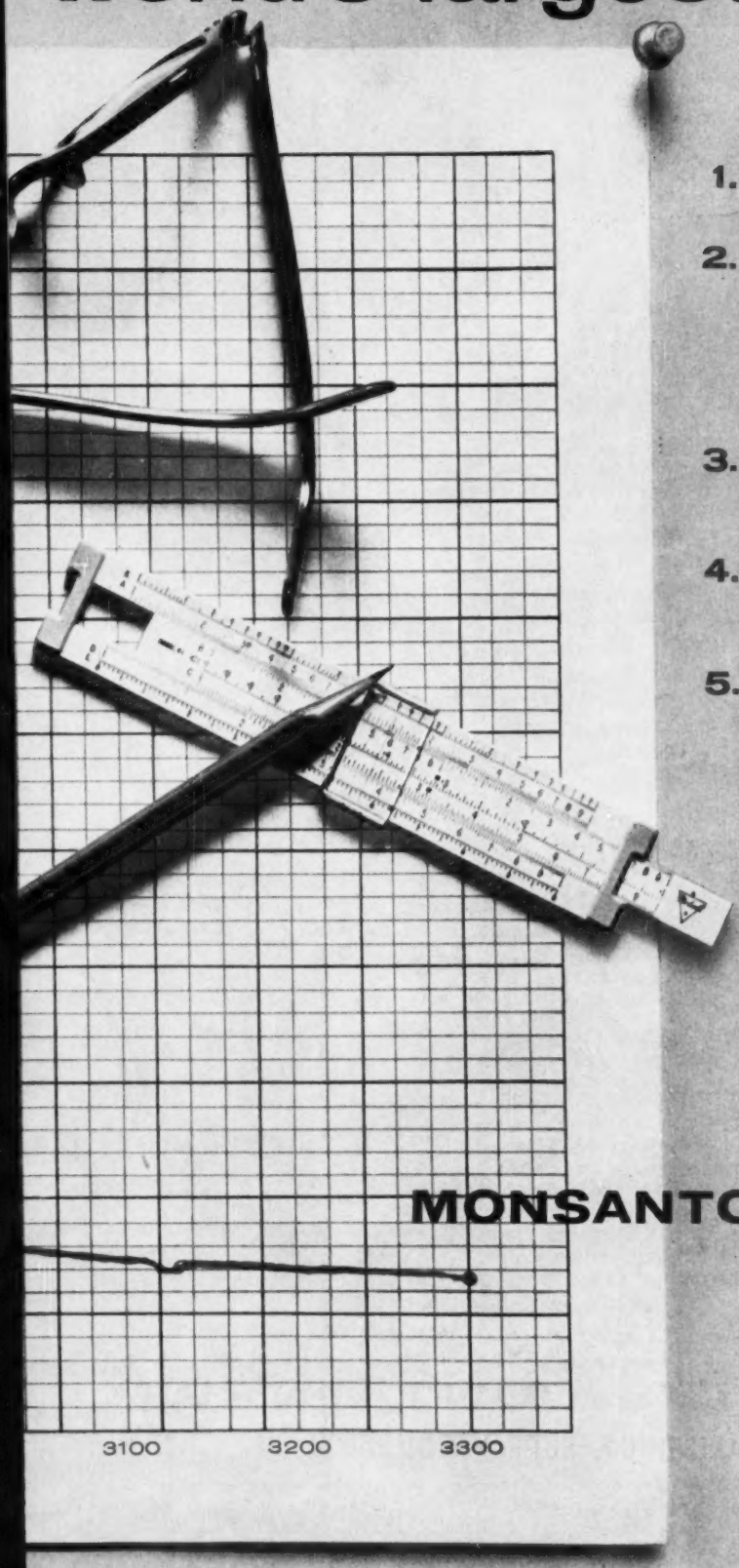

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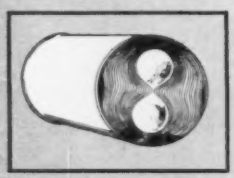

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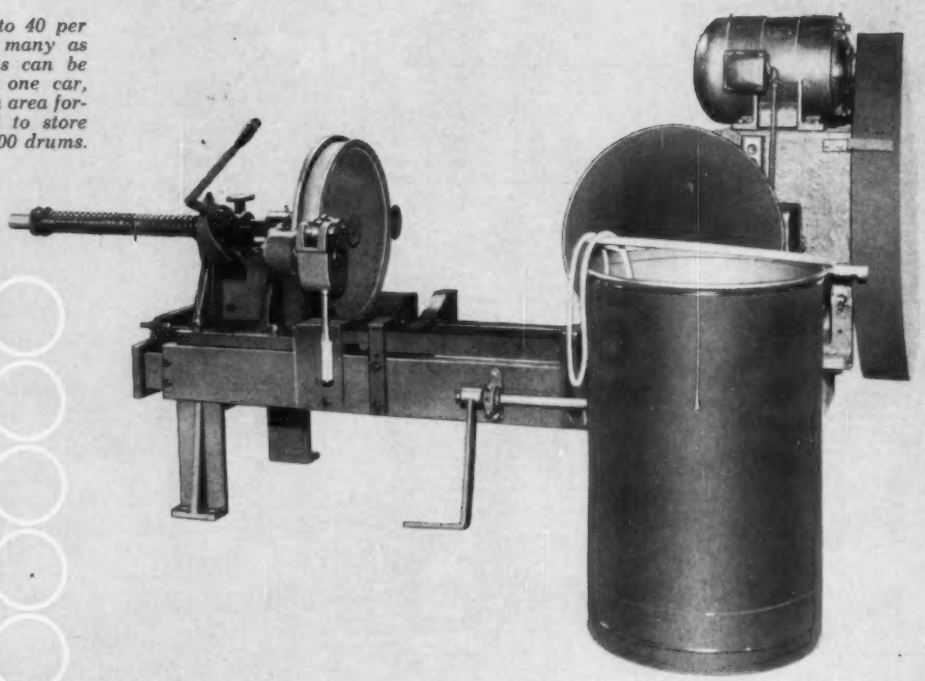
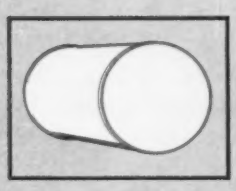
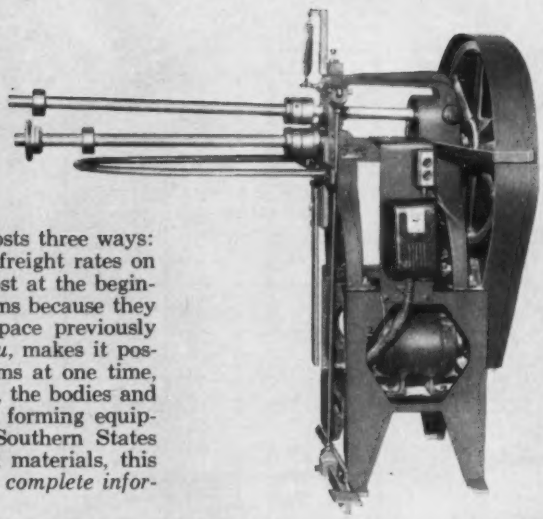




Drum shells are easily assembled into completed container with the bottoms, heads, gaskets and closing rings provided separately packaged.



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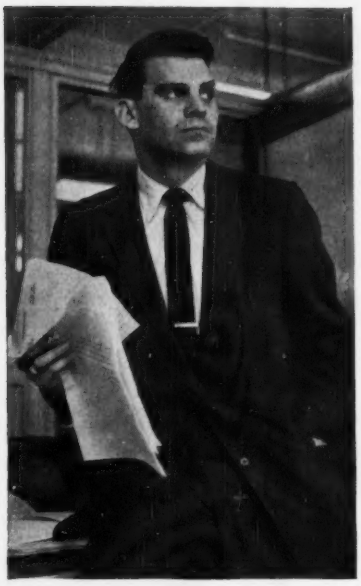

Liaison in Leipzig

Last month, as CHEMICAL WEEK's German news bureau chief, Morrie Helitzer (*above*), was arranging a trip into East Germany to cover the Leipzig industrial fair, he was given this special assignment: find out just what the Communist government there is doing with its chemical industry.

Results: a fresh, on-the-spot report on how fast the East Germans are building up their chemical industry and what this means to the rest of the world (*p. 20*); an up-to-the-minute list of East Germany's chemical plants, including those under construction (*p. 22*); and an exclusive interview with the commissar who heads the chemical industry development committee for the entire east European bloc (*p. 23*).

Helitzer — who has managed McGraw-Hill's Bonn bureau for more than a year, and who speaks German (as well as English and French) fluently —passes along a warning that East Germany's chemical industry accomplishments should be taken seriously. Industry leaders in West Germany—who know more than most Westerners about what their Communist-led counterparts in East Germany are doing—say that people who underestimate East Germany's chemical industry are in for the same kind of shock that Americans got from the first Sputnik.

Atomic Industry Growing Pains

VISITORS TO LAST WEEK'S NUCLEAR CONGRESS at New York's Coliseum could find many indications that the still-young nuclear industry has attained a certain maturity. In place of the ballyhoo and futuristic drawings of hoped-for atomic developments that characterized many of the earlier atomic exhibits, most displays featured down-to-earth developments—nuclear materials and hardware designed to fit realistic needs. And the purveyors of these nuclear wares make it quite clear that they're in business to make a profit.

There is still much concern, however, over the problem of conflicting interests of private industry and the Atomic Energy Commission's nuclear facilities. And many processors are quick to criticize what they feel is "unfair competition" stemming from government-owned operations.

While it is quite obvious that private industry has proved its ability to put nuclear processing on a paying basis, even the most outspoken proponents of private participation must admit that the transfer of all phases of the business to commercial plants will take time.

Despite the avowed top-level policy that the national effort to develop atomic energy shall be based on strengthening free competition in private enterprise, there seems to be an unwarranted lag in implementing this plan on lower levels of responsibility. Government-owned laboratories have continued to expand the size and scope of their research and development activities. And since many R&D units are adequately staffed and equipped to also commercially produce nuclear materials, local AEC authorities are generally quite reluctant to turn pet projects over to industry.

Industry acknowledges the continuing need for government-owned and -operated plants in the nuclear weapons field and in other noncommercial areas. Its chief complaint is that there is a tendency toward "empire building."

Of course, AEC must be able to utilize its $1-billion investment and $500-million annual operating budget to the best advantage. But it should not rationalize expansions of laboratory operations into the commercial field on grounds that such work is required to justify initial research and development expenditures.

As a result of growing competence of private industry, there's more opportunity for AEC to farm out many research and development projects. Commercial nuclear fuel producers, for example, are budgeting more funds for research than they normally spend to support conventional chemical operations. By farming out fuel research projects to these firms, AEC could not only avoid wasteful duplication but also contribute to the base work load that private industrial plants need for economic operation.

Industry's case has been presented to the Congressional Joint Committee on Atomic Energy by the Manufacturing Chemists' Assn. and the National Assn. of Manufacturers. Now it's up to the industry's private firms to make their capabilities known and to pursue commercial nuclear business aggressively.

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LETTERS

Rocket Propell(α)(e)nts

To THE EDITOR: I wish to call to your attention the consistently wrong spelling of the noun "propellant" by CHEMICAL WEEK. As it appears in various articles in your periodical, it is incorrectly spelled "propellent," which is the correct spelling for the adjective.

My references are Funk & Wagnall's College Standard Dictionary, and universal usage by the rocket propellant industry, especially in its countless reports to the government.

J. R. GOULD
Stauffer Chemical Co.
Chauncey Research Laboratory
Chauncey, N.Y.

Webster's Unabridged allows both spellings for the noun, but CHEMICAL WEEK *will hereafter follow standard industrial practice.*—ED.

Magnetic Inks

To THE EDITOR: I was quite pleased with the article on magnetic inks (*March 12*), and I feel it was exceedingly accurate and a fair statement of the state of the art. There have been so many articles published on MICR wherein only half the facts were presented or . . . facts were distorted. This has led to a great deal of confusion and misunderstanding.

It was a rather pleasant surprise, therefore, to read an article that summed up the situation concisely and reached logical conclusions.

R. E. MAXWELL
Director, Research and Development
Burroughs Corp.
The Todd Co. Division
Rochester, N.Y.

No Price-Cutting

To THE EDITOR: . . . We found a small notice (*Feb. 6, p. 81*) on which we would like to add a few comments:

[You write] "The international fertilizer market is rapidly deteriorating because of price-cutting by all major producing countries, including the U.S., Japan, Germany, Norway. There is evidence that foreign as well as U.S. producers are feeling the blows."

Since our company is the only exporter of chemical fertilizers in this country, this news item can refer only to some apparent initiative taken by our company in its price-setting. We are, however, not aware that we have pursued a policy that in any way can be termed as "price-cutting." . . .

NORSK HYDRO-ELEKTRISK KVAELSTOF
Oslo, Norway

Openness Doesn't Hurt

To THE EDITOR: Re trade secrets, the petroleum industry has proved that when everybody is willing to license everybody else, no one gets particularly hurt.

ROGER WILLIAMS, JR.
President
Roger Williams Technical & Economic Services, Inc.
Princeton, N.J.

Right Town, Wrong P.O.

To THE EDITOR: In your recent report on jet fuels (*Feb. 27*) "Billion Dollar Jet Fuel Opportunity," you give the address of Applied Science Laboratories as University Park, Pa. It should be State College, Pa.

The confusion probably stems from the fact that The Pennsylvania State University's postal address has been changed from State College to University Park, while the name of the town and its post office continues to be State College. Applied Science Laboratories, Inc., is a completely independent organization, not affiliated with the university. . . .

ARTHUR ROSE
Technical Director
Applied Science Laboratories, Inc.
State College, Pa.

MEETINGS

American Institute of Mining, Metallurgy & Petroleum Engineers, Southwest metals, and minerals conference, Ambassador Hotel, Los Angeles, April 21-22.

American Ceramic Society, annual meeting, Bellevue Stratford Hotel, Philadelphia, April 24-28.

Second European Symposium on Chemical Reaction Engineering, Amsterdam, Holland, April 28-30.

Parenteral Drug Assn., Warwick Hotel, Philadelphia, April 29.

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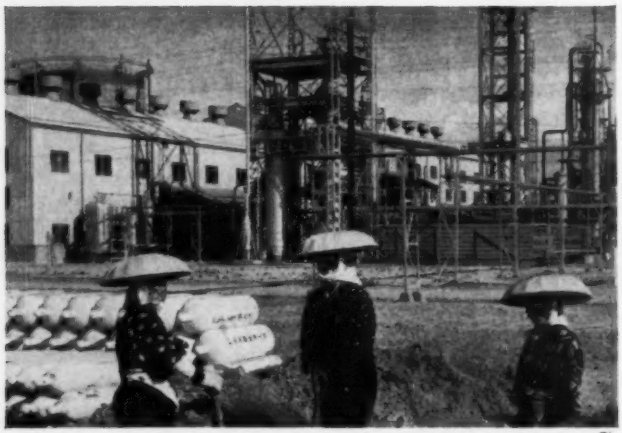

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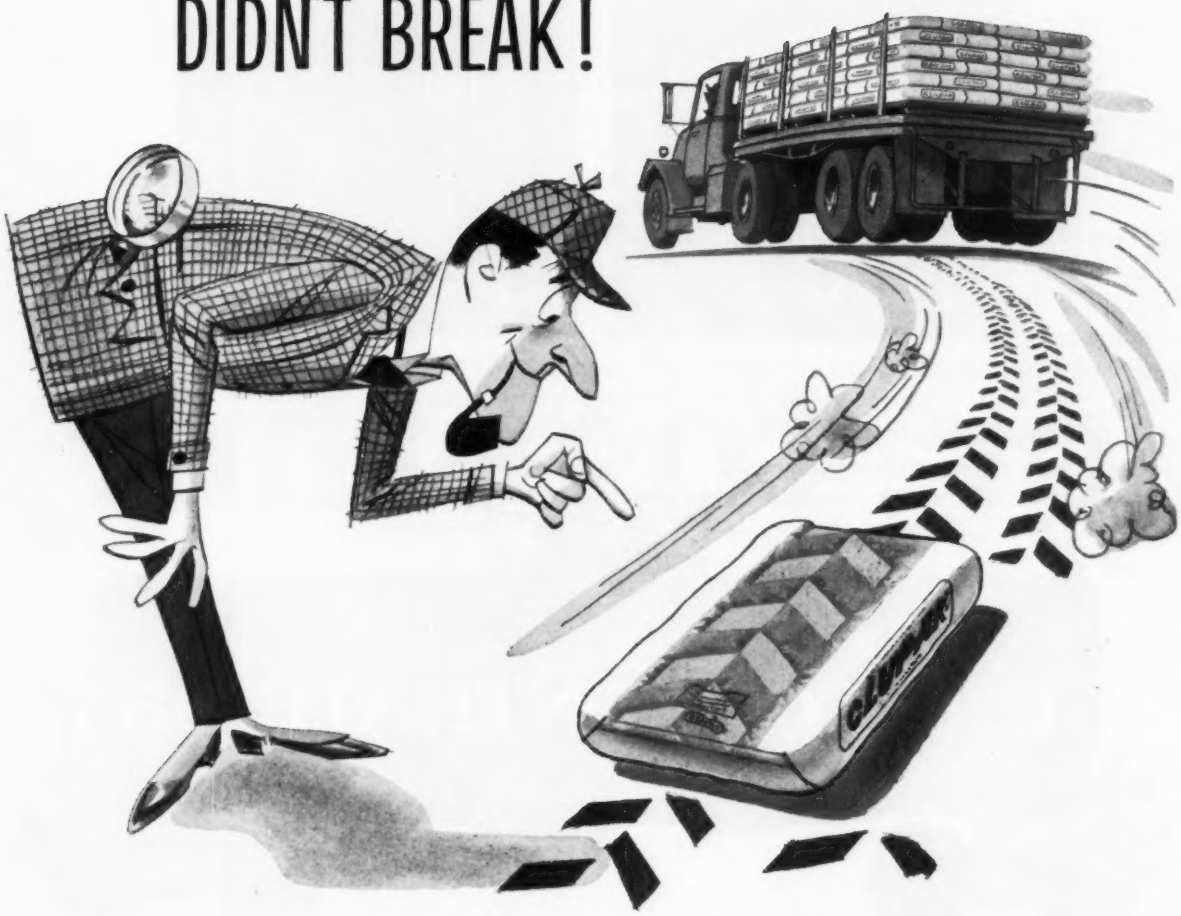

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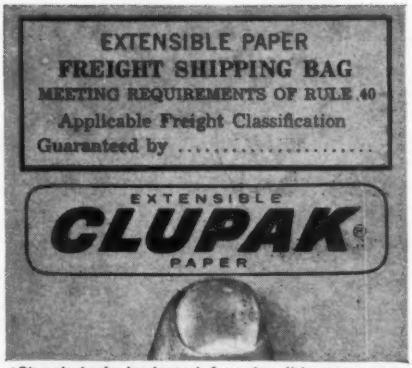

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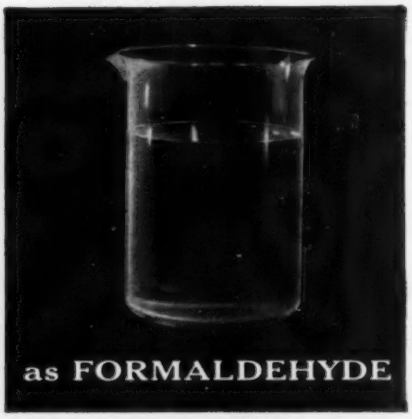

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Business
Newsletter

CHEMICAL WEEK
April 16, 1960

Look how three companies are building up their plastics lines:

• Reichhold Chemicals is planning another acquisition that will further its plan for integration all the way from raw materials to end-products. RCI is negotiating for acquisition of a stock interest in Modiglass Fibers, Inc. (Florham Park, N.J.), a glass-fiber producer headed by Piero Modigliani. Bringing Modiglass into the Reichhold organization would give RCI's recently acquired Alsynite operation (*CW Business Newsletter, Feb. 27*) an assured supply of glass fiber for its reinforced-plastics products. The amount of Modiglass stock to be acquired by RCI has not been decided.

• Hercules Powder is clearing the way for potentially large-scale use of polypropylene in food packaging. On the basis of a Hercules petition that may serve as a model for industry in general, the U.S. Food & Drug Administration has granted across-the-board approval for use of two Hercules polypropylene resins—Pro-fax 6520 for film and 6513 for injection molding and extrusion—in packaging products coming into direct contact with food. It's the first time packaging materials have won FDA approval through issuance of a formal food additives regulation. Hercules —first U.S. producer of polypropylene—predicts this will "broaden widely the use of packaged foods." Industry experts say polypropylene molded and film products have a big potential in food packaging, with film to account for about 30% of eventual total demand for polypropylene.

• Celanese Plastics Co.— a Celanese Corp. division whose sales last year rose 13%, to $45.5 million—is stepping up its development program. It will renovate a recently acquired building at Clark, N.J., for use, starting in '61, as a central laboratory facility for market development and customer technical service of its plastics materials, old and new. Basic research in polymers will continue at the corporation's central research laboratories in Summit, N.J.

•

The proposed speedup of the European "Common Market" may be delayed until October or January, which would allow time for GATT negotiations to soften the sting.

Meanwhile, trade bloc development in Latin America continues. Integration in Central America took a step forward last week when Honduras followed El Salvador and Guatemala in ratifying the three-nation common-market pact signed in February. Hopes are that Nicaragua and Costa Rica—signers of the earlier, still-stalled five-nation treaty—will be drawn into the group at a meeting later this month.

•

Europe's synthetic rubber buildup continues. In the Netherlands, B. F. Goodrich Chemical and AKU will expand capacity of their

jointly owned subsidiary, which produces butadiene-styrene, high-styrene, and nitrile rubbers. And Royal Dutch-Shell's Shell Nederland subsidiary will build capacity for the new polydiene rubbers, such as polybutadiene and polyisoprene. Meanwhile, Goodrich Gulf, which plans to produce the polydienes in the U.S., has already lined up a United Kingdom distributor, Durham Raw Material Ltd.

•

First-quarter sales figures are all up, but the gains vary widely. Hooker Chemical's sales rose 3.7%, to $36.2 million; but earnings dipped 6.5%, to $3.0 million. Factors in the decline: increased expenditures for research and development, higher costs of labor and materials, and slightly lower average selling prices. Commercial Solvents estimates its first-quarter sales at 6% higher than last year's $15.9 million. Pierce and Stevens Chemical Corp. reports January-February sales up 12%, to $1.4 million, and earnings up 20%, to $103,984. National Starch and Chemical says sales and earnings in the past three months were both up about 8%. Wyandotte Chemicals looks for a 15% rise in sales, but is not putting a figure on its anticipated gain in earnings. And Canadian Industries Ltd. says its first-quarter sales were about 18% higher than in '59.

•

Question of the week: What will other antifreeze producers—particularly Union Carbide, long a leader in this business with its Prestone products—do in the face of intensified competition from Du Pont, Olin Mathieson, and Dow?

Dow started this new go-round this year when it came out with Dowgard, a sealed-in coolant to be changed every spring (*CW Business Newsletter, Jan. 9*). A month later Olin Mathieson started plugging its Permanent Pyro, termed a noncorrosive antifreeze (*CW, Feb. 13, p. 72*). And last week Du Pont topped all these new-product claims with its new "never-drain" Telar. Key to its lasting qualities: a corrosion-inhibiting additive "package" made of four ingredients said to make a truly permanent coolant with water from any locality. Patents covering the additive combination are expected to issue soon.

•

The rocket and propellant business is still growing, but at a more gradual rate than it did last year.

B. F. Goodrich Co. is starting an expansion program that will triple the production capacity of its rocket motor plant at Rialto, Calif.

And Thiokol Chemical Corp.—whose Rocket Division more than doubled its sales volume last year, from $77.2 million in '58 to $173.5 million in '59—is anticipating continued growth this year. But Thiokol adds that last year's "tremendous strides" will tend to overshadow this year's growth. (With Chemical Division sales up from $10.4 million to $13.8 million, and Specialty Division sales up from $1.4 million to $2.9 million, Thiokol's over-all business bolted from $89 million in '58 to $190.2 million in '59. Net income rose 83%, to $5.5 million.)

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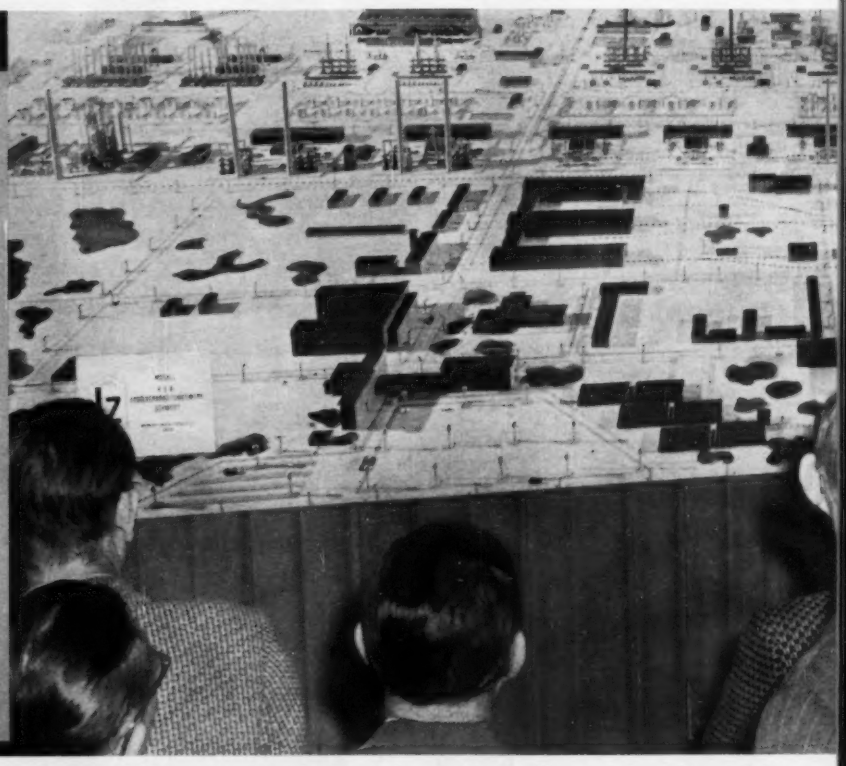
East German Exclusive

Although battered by bombing raids and then stripped by the Russians for reparations, chemical plants in East Germany are now expanding well beyond their 1939 capacity levels. Here—from on-the-scene reporting by CW's Bonn News Bureau—is the story of this chemical industry buildup: how it's being done and how it figures in East-West diplomacy, including next month's big summit conference



Model of big petrochemical works to be built at Schwedt-on-Oder

East German Chemicals Back Reds'

A strong and growing East German chemical industry has become another trump card in the hand of Soviet Premier Nikita Khrushchev. There's little doubt that at next month's summit conference in Paris, he will confront the U.S., British and French heads of government with the grim fact that in the 10 years since it was formed, the "German Democratic Republic" — which surrounds Berlin — has been forged into a solid Communist state.

East German industries can now fill that state's own needs, supply vital products to the rest of the Soviet bloc, and provide goods for bartering with non-Soviet countries. In such bartering—which is usually tied in with the Communists' diplomatic strategy —East Germany's expanding chemical industry plays a major role.

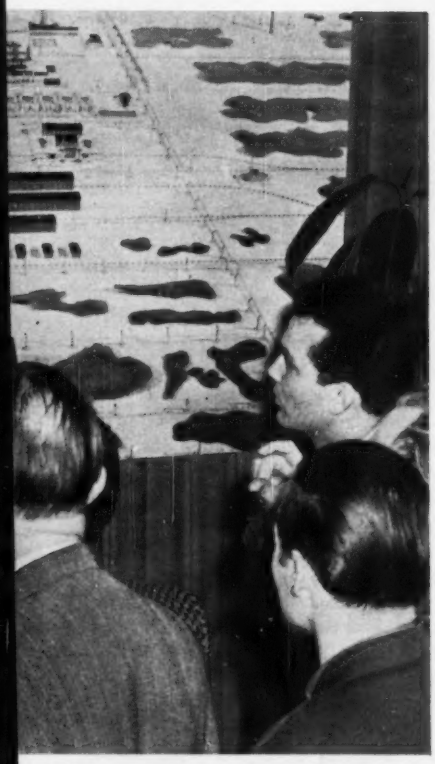
Last month East Germany's economic offensive seemed to pay off when it proclaimed its first diplomatic recognition by a non-Communist country—Guinea. Significantly, East Germany had been the first country to sign a trade agreement (in '58) with that newly independent African state. Figuring prominently in East Germany's side of the protocol: fertilizers, pharmaceuticals and other chemical products.

Measuring Up: Sizing up East Germany's chemical industry is tricky. It accounted for roughly 15% of the $15 billion* worth of industrial goods produced in '59—only half what the metal processing industries contributed. Its investment allotment and scheduled production increases will improve this relative standing at the end of the current seven-year plan (1959-65), but not radically. On the other hand, it has been assigned the leading role in the chemical sector for the entire Communist-bloc economy (*CW, April 25, '59, p. 25*).

*At the official exchange rate of 4.2 East German marks to $1. The free market rate is 14-15 marks/$1.

It is also the leading Communist exporter of chemicals, and in trade with the "development countries"—prime target of the "ruble offensive" —chemicals comprise 25% of all East German exports. Moreover, East German chemical exports have shifted steadily away from a preponderance of raw materials, and now finished products account for about half the total.

Among their chief yearly export totals: 1 million tons of potash, 100,000 tons of nitrogen fertilizer, 200,000 tons of sodium sulfate, more than 100,000 tons of soda ash, about 30,000 tons of solvents, 20,000 tons of magnesium sulfate, 15,000 tons of



typifies East German buildup plan.

Summit Bid

polyvinyl chloride, 50,000 tons of synthetic rubber, 85,000 tire casings, about 80,000 tons of gasoline, around 280,000 tons of diesel fuel, as well as insecticides, caustic soda, caustic potash, potassium carbonate, paints, varnishes and photographic film.

Second-Class Industry? Despite this, many western European engineers and chemical executives consider the East German chemical industry no better than second-class.

Said one in private conversation recently: "The East Germans have been hard put to rebuild their plants. The Russians have supplied little equipment, and they build little themselves. It's been a patchwork job. The Leuna Works used to have the largest synthetic ammonia production in the world — 700,000 tons/year. Now, after much improvization, they're producing about half that and have admitted that because of depleted brown coal deposits and transport troubles they won't be able to raise it to more than 450,000 tons, which is the size of the largest West German plant. It'll be a long time before East Germany emerges as a competitive force in the chemical world, if ever."

But West Germans, who know more about the East German industry than most other non-Communist observers, are more cautious.

"Remember," said one observer, "they are about five years behind us in rehabilitating their industry. Some of their equipment is very outdated, of 1920 vintage. But in many cases, they're having production difficulties with comparatively modern equipment because of lack of spare parts and insufficient repair and maintenance, which has nothing to do with the chemical people. Their Agfa film (East Germany's film material is marked Agfa-Wolfen, in contrast with the West German Agfa-Leverkusen) is still of world-standard and they export about 6 million square meters annually.

"East German scientists are doing very important research in silicones, their rigid PVC for ducts and water pipes is highly advanced, and they're up-to-date on all developments through literature. The people who underestimate them today may receive the same shock in five years that the Americans got from Sputnik."

The stretching out of East Germany's second five-year plan (1956-60) into a Soviet-type seven-year plan (1959-65) averted some glaring goal failures, modified and accelerated other targets. The expansion of basic materials is to be completed within this framework, but the emphasis has shifted to finished products, especially plastics and synthetic fibers with a petroleum rather than a lignite base.

Race with the West: Already, party leaders—from First Secretary Walter Ulbricht on down—point with pride to the East German chemical industry as the seventh largest in the world. And they promise, using plastics as a springboard, to leap ahead of West Germany in output of what is vaguely termed "the most important consumer goods" by '61.

Of the $2.6 billion allotted for chemical industry investment in the seven-year plan, nearly 45% will be spent on machinery and another 33% on buildings, with the emphasis on procurement of complete plants. For example, laggardly delivery of electrical equipment to Coswig slowed the sulfuric acid project there. To solve this problem, VEB Komplette Chemieanlagen was founded to assume the role of chief contractor. It will receive all orders, channel them to producers, coordinate production schedules and probably handle final assembly. It is scheduled to supply 400 complete production facilities for 137 chemical projects by '65.

Supplementing VEB Komplette Chemieanlagen is the recently formed technical-scientific center VVB Chemie- & Klima Anlagen, which will analyze the function and efficiency of domestic and foreign products. Later, this group will do development work.

One way the East Germans intend to build up their industry is by buying help from the West—e.g., the recent contract with Britain's Humphreys & Glasgow, Ltd., for ethylene plant design and the proposed purchase by an east European consortium of polyethylene know-how.

Hard Climb: Still, it will be a hard climb before East Germany reaches its chemical goals.

Rehabilitation of industry started seriously at the beginning of '54, after the Russians sold back all confiscated plants to the East Germans.

All "fulfillment" figures must still be examined with care. For example, in '59, the first year of the seven-year plan, production schedules "on the average" were overfulfilled, but they were not met in some specific important commodities, such as sulfuric acid, soda ash, caustic soda and PVC powder. Investment plans for two of the most important projects—the synthetic rubber works at Halle and the sulfuric acid plant in Coswig—were not fulfilled, either.

One major problem the East Germans have to contend with is the steady draining away of their skilled

East German Exclusive

PRINCIPAL PLANTS AND PROJECTS

Name and Location	Products and Employees	Construction Plans
Walter Ulbricht Chemical Works, Leuna	Ammonia and other nitrogen products, petroleum derivatives, basic materials for plastics. 30,000 employees.	Total capacity to be doubled by '65. Expansion of capacity for ammonia, urea, methanol and gasoline; new units for caprolactam, polyethylene, nitrogen fertilizers, ammonium bicarbonate.
Buna Chemical Works, Halle	Calcium carbide, synthetic rubber, polyvinyl chloride, polystyrene, acrylonitrile, polyvinyl acetate. 18,000 employees.	New, 270,000-tons/year carbide unit and new hydrochloric acid plant will be ready in '61. Expansion of capacity for synthetic rubber, plastics.
Electrochemical Combination, Bitterfeld	Caustic soda, chlorine, other inorganic and organic industrial chemicals, aluminum, industrial diamonds, polyvinyl chloride. 14,000 employees.	New, $2.4-million PVC plant to be built. Capacity for aluminum and PVC to be increased.
Film and Fiber Works, Wolfen	Rayon, other man-made fibers, photo chemicals and films. 15,000 employees.	Expansion of facilities for wool-crylon fiber.
Dyestuff Factory, Wolfen	Dyestuffs, pharmaceuticals, fertilizers, pesticides, sulfuric acid. 7,000 employees.	Expansion of facilities for sulfuric acid from gypsum, dyestuffs, superphosphates.
Gabel-Deoberitz	Tetraethyl lead.	Originally scheduled to start up in '58; delayed.
Guben	Nylon-type fibers.	First stage to be completed by '65; capacity then will be 10,000 tons/year of Lanon, 4,000 tons/year of Perlon. Work force to be doubled to 10,000 by '75.
Coswig-Anhalt	Sulfuric acid from gypsum.	Plant to start operating in June '60 at 100,000 tons/year; when completed, capacity will be 200,000 tons/year.
Schwedt/Oder	Petrochemicals.	100,000-bbls./day refinery and petrochemical plant to start in '63, using oil piped from Russia; to be completed in '65.

manpower by refugee flights to the West.

For this reason, the East German Communist party (Socialist Unity Party) has directed the machinery industry to supply highly automated equipment, improve and increase production of measurement and control instruments, and concentrate on equipment of high quality and long life.

Energy shortage has been as critical a problem for industry as the manpower shortage. Although East Germany has the largest lignite deposits in the world, they have been insufficient, and in some cases ill-suited, for the multiple demands placed on them —as a source of power, diesel oil, ammonia synthesis, nitrogen fertilizers, carbide, synthetic rubber and plastics.

East Germany hopes to close its energy gap by '61 through increased oil imports, and greatly increased gas production at the postwar Schwarze Pumpe lignite mining and processing complex near the Polish frontier. Erection of a 5-million tons/year oil refinery at Schwedt-on-Oder, which is at the end of a 2,500-mile oil pipeline from the Soviet Union, will undoubtedly have an effect on the importance of "Schwarze Pumpe."

Organizational Overhaul: To meet the demands of the new seven-year plan as well as the longer-range Communist-bloc 15-year plan (1961-75)—to be disclosed more fully late this year—East German industry was drastically reshuffled at the beginning of '58. A large number of ministries, including the chemical ministry, were incorporated in the top-level State Planning Commission. Chemical Minister Werner Winkler (*see p. 23*) was given the new title of chief of the Chemical Section in the planning commission. Subsequently, Winkler became deputy chairman of the commission.

A number of privately owned (or partly government owned) plants are still operating. They produce mostly specialties and pharmaceuticals, account for about 5% of total chemical output. But these entrepreneurial holdouts are being squeezed out of the picture.

"Chemistry provides bread—prosperity—beauty," East Germany sings in its seven-year plan. It is also becoming a powerful tool with which to serve the bolder aims of the entire Communist bloc.

East German Exclusive

Here's the gist of CW's interview with Dr. Werner Winkler—head of the chemical industry in East Germany and the chemical industry development committee for all of East Europe—at Leipzig

Modernization-Minded Chemical Industry Czar

Question: *In the next few years the West German chemical industry expects to spend more of its new investments for modernization and mechanization and relatively less for construction of new plants. What is the intention of the chemical industry in the German Democratic Republic?*

Answer: There are no unique developmental methods for chemical industries in different countries. In principal, development is always the same; only the raw materials differ from one nation to another. In the chemical industry, increasing of plant productivity is most important. Here in the GDR, for instance, we plan to double our chemical production with the same amount of labor. To this end—and also because of the rapid obsolescence of chemical processes—our chemical industry also has been concentrating not so much on construction of new facilities as on modernizing old plants. Up to '54, we spent 20% of capital investments for rationalization*; today it is 45%. And our annual investments are now nine times greater than in '55.

Q: *Do you know the present average age-level of machinery and equipment in your chemical plants?*

A: A very large part of the chemical industry here in the GDR came into being only after '36—for example, the Buna Works. Another portion, including such plants as those at Leuna, Zeitz and Boehlen, was nearly 90% destroyed during the war. Some plants were dismantled. In '46, our chemical production amounted to only 40% of the '36 total; now it surpasses that level. More than half of our capacity was installed after '46.

Q: *The GDR has recently signed agreements with the United Kingdom for purchase of chemical know-how and plants. Are there any other Western nations that you think might be interested in such agreements?*

A: The chemical industry needs a great scientific capacity. It is simply impossible that a country like ours, with 17 million people, can carry out, all by itself, the necessary research in the vast field of chemistry. For this reason, we are coordinating our work with all the Socialist countries. In addition, we are always interested in negotiations with capitalist countries concerning acquisition of patents, licenses, project plans, equipment and complete plants. This is surely in the interest of all nations. When we negotiate with parties in West Germany or elsewhere, they don't ask how we will pay for their chemical processes; they ask instead what processes we can offer them. France, Austria and West Germany—as well as Britain—are interested in our business. With West Germany, we will certainly arrive at firm agreements soon.

Q: *May we assume that your chemical industry will continue to be based on lignite?*

A: Every country must develop its chemical industry on the basis of the raw materials available. For the GDR, that means lignite. For us, the development of petrochemicals is supplementary. Our transition to petrochemical production is just beginning. The switchover to petrochemicals in West Germany began four years earlier than here, in '52. But our investments in petrochemicals in '59 were more than 30% higher than in '58; and in '60, they'll be up 100% from '59. The reason we started later on petrochemicals is that before '45 the greater part of heavy chemical equipment had been produced in West Germany.

Q: *The GDR has been assigned a leading role in the east European economic council for chemical equipment. Can you describe some of the work being done toward standardization among Comecon members?*

A: Especially in the field of heavy engineering, comprehensive specialization and cooperation are being carried out among the Socialist countries. Therefore, the manufacturer of chemical apparatus is not concentrated only in our republic, but in all Socialist countries that have a relatively advanced heavy engineering industry. I am thinking especially of the Soviet Union, Czechoslovakia and Poland. In cooperation, we are starting with a joint research program and are seriously striving for standardization in order to go into mass production in this field also. On this basis, chemical equipment now is being produced in countries of our economic system that previously had no such industry—for example, Hungary, Rumania, Bulgaria.

Q: *What types of industrial chemical plants is the GDR offering to developing countries [such as India]?*

A: When an underdeveloped country starts to industrialize, it doesn't start with a chemical industry but with a food processing industry, and then a textile industry. But if there is a desire to obtain chemical equipment from us, we are, in principle, ready to help.

* Rationalization, as used in European industry, means maximizing the efficiency and productivity of manpower and capital resources.

New Chemical Stress

Pittsburgh Coke & Chemical Co. is pressing the corporate-growth buttons, putting into play a number of growth maneuvers. Among them: expansion, acquisitions and consolidation. More specifically, these moves entail:

• Consolidation of its three chemical divisions—activated carbon, protective coatings, industrial chemicals—into a new, wholly owned subsidiary to be known as Pittsburgh Chemical Co. This new entity—to be headed by W. Kenneth Menke—is expected to account for at least one-third (about $25 million) of Pitt Coke's '60 sales.

• Expansion of the chemical subsidiary's activated carbon business through construction of a $4-million coal-processing plant in Boyd County, Kentucky. This plant—to be completed early in '61—will be located on a 25-acre portion of a 300-acre tract on the Big Sandy River south of Catlettsburg.

• Consolidation of the cement division and the U.S. Concrete Pipe Co. subsidiary into another new and wholly owned subsidiary to be known as Green Bag Cement Co. At the helm will be Robert M. Moore.

• Acquisitions to expand the new cement and pipe subsidiary. Following last year's $4-million purchase of Universal Sewer Pipe Corp. (Cleveland), the company acquired a concrete pipe plant in Kalamazoo, Mich.; property for a new plant in the Pittsburgh area; and a site near Ocala, Fla., for a vitreous clay pipe plant. Operations at the concrete pipe facility near the company's main plant on Neville Island (near Pittsburgh) are being discontinued.

Activity in Chemicals: The company will continue to pay close attention to chemicals. Construction of a $4-million maleic anhydride plant is about to begin on the Neville Island location, besides work on the new activated carbon plant in Kentucky. In fact, this year's capital expenditures budget is up sharply, to about $9 million (this includes acquisitions already completed). Meanwhile, the sulfuric acid unit on the same site is being rehabilitated and expanded to increase capacity about 70%.

Last year's chemical projects included completion and startup of a fumaric acid unit, expansion of the phthalocyanine unit and reduction of costs and increase of throughput of the phthalic anhydride plants.

Chemical Growth Ahead: During '59, the Industrial Chemicals Division boosted its sales 14% over the '58 total; and sales of its products—benzene, phenol and other coal chemicals and their derivatives—are expected to register another gain this year. Operations are centered at Neville Island.

The Coatings Division last year set new records for shipments from its Neville Island and Summit, Ill., plants. It increased sales outside the U.S. through formation of a jointly owned sales company, and reorganized its U.S. and Canadian marketing activities. The product line includes Tarset coal-tar-epoxy resin coatings and other upgraded pitch products.

But the fastest growth among these divisions last year was recorded by the Activated Carbon Division, whose sales and production figures were reported at 100% of the Neville Island plant's capacity. Company President Henry Hillman is telling his stockholders: "A major expansion of the plant was completed before year-end, and this welcome added capacity was fully utilized as soon as it became available."

With consumption of granular activated carbon rising in an increasing number of applications—from sugar refining to hydrocarbon separation—the stage was set for the decision to build the new plant in Kentucky. Major factors in selecting the Catlettsburg site: proximity to reserves of special grades of coal in West Virginia and Kentucky, and future availability of water transportation when the Greenup Dam on the Ohio River is completed.

Teaming Up for Profits

New products and processes—in plastics, elastomers, and possibly fibers—are in prospect for Texas Butadiene & Chemical Corp. And the glitter of these new business prospects is likely to have considerable influence on stockholders of Industrial Rayon Corp. when they vote April 29 on a proposal to merge the firms.

It's probable, however, that TB&C's thriving butadiene business alone will prove attractive enough to IRC stockholders, who have been told that their company is in immediate need of a transfusion. IRC sustained an $82,745 loss during fourth-quarter '59, and in the first two months of '60 has been nicked with an additional $240,000 red-ink entry.

"These losses," IRC executives state in their proxy notice, "have created a situation with which management must deal vigorously in an effort to restore earning power and to prevent dissipation of assets in unprofitable operations."

By contrast, TB&C—a smaller and much younger company—has been advancing by leaps and bounds. In '59, it increased its sales by more than 20%, to $42.2 million, and more than doubled its earnings, to $3.6 million. Its profit margin was a healthy 8.6%, while IRC's was down to less than 1.4%.

IRC's principal problems, as seen by management:

• Profit on Tyrex cellulosic yarn for tire cord has been squeezed by increased production costs and lower selling price—largely because of price competition from producers of nylon tire cord.

• Sales of rayon yarn for textile use has been hurt by depressed conditions in the textile business, competition from other fibers, excess capacity in the rayon industry.

By joining with TB&C, ARC will gain entry into new and probably more rewarding fields. TB&C has a 30% interest in a joint venture in France, which is now building a $38-million synthetic rubber plant near Marseilles and planning a butadiene plant there for captive use. And TB&C is awaiting government approval of similar projects in Argentina.

TB&C's research work has focused on preparing high-purity propylene and butylenes and finding improved ways to produce isoprene for new synthetic rubbers. Also, the firm reportedly has acquired a process for making high-energy fuels for use in high-speed, long-range aircraft, and is pilot-planting newly developed polymers based on styrene, maleic anhydride and butadiene. It's also thought that IRC management is interested in new fibers that may evolve from TB&C products.

Starch Plea Denied

Another CPI segment feels that it's being wronged by the federal government's handling of tariff and import problems. This time it's the producers of corn starch, whose complaints about "increasing tonnages of cheap imported starches being sold in this country" were brushed aside by the U.S. Tariff Commission last week.

At the request of the Senate Finance Committee, the Tariff Commission conducted a study of the domestic starch industry and came up with these findings:

- Imports of tapioca products used to make starch jumped from 62 million lbs. in '54 to 226.1 million lbs. last year.
- Total starch imports increased from 211 million lbs. in '58 to 272 million lbs. in '59—a rise of 28.9%. Last year's domestic production was up just 6.8%, to 2.3 billion lbs.
- Total starch imports were equal to 9.7% of domestic production in '58, but were up to 11.7% of domestic production in '59.

The Tariff Commission concludes that imports were only 4.8% of domestic consumption — which probably won't strike Congress as very ominous.

One controversy over compilation of the figures concerns data for U.S. consumption of corn starch. The Tariff Commission insists on including in this total the starch equivalent of corn syrup and corn sugar; this leads to a "consumption" total that is more than twice as large as the sum of the "domestic production" and "imported" figures. Industry people dispute this procedure, contending that the syrup and sugar are not derived from starch but are coproducts.

Concerning the tapioca products, which make up the great bulk of imported starches, U.S. producers say these are competitive with corn starch, which comprises the bulk of domestic output. They argue that the duty on this source of starch should be the same as on other sources such as corn, potato, rice and wheat starch — which carry rates ranging around 1¢/lb.

After getting nowhere with the Tariff Commission, domestic producers are now trying their luck with the Treasury Dept. Asserting that foreign starches are sold here at prices considerably lower than those of domestic starches, Corn Products Co. (New York) and other U.S. producers are asking the Treasury to investigate the possibility that competitive starch is being imported and sold here in violation of the antidumping law.

National Starch Sales Rising

One of the nation's 11 principal corn starch producers — National Starch & Chemical Corp. (New York) — says it's doing better than ever, despite the import problem.

For the first quarter of this year, Chairman Frank Greenwall told New York security analysts last week, sales and profits are expected to be up about 8% over the corresponding period of '59. This comes after the company set new business records in '59 as a whole: sales up 14.2%, to $52.8 million; and net income up 6.6%, to $3.3 million.

Principal expansion projects now under way are a one-third increase in capacity of the specialty starch facility at Indianapolis, Ind., and addition of a new unit at the Meredosia, Ill., plant to produce a new type of resin for use in coatings for the paper, textile and other industries.

ACS's 10-day Stand

Last week and this week in Cleveland some 7,000 chemists and chemical engineers from industry, education and government swarmed to discussions of technical topics ranging from gypsy moth lures to electric membrane demineralization.

Occasion: the 137th national meeting of the American Chemical Society, being held in Cleveland's Public Auditorium and in four nearby hotels, with many of the discussions continuing into the foyer of a close-at-hand movie theater whose showing of "Ben-Hur" attracted numerous delegates.

With 1,122 technical papers being presented, the program was extended to 10 days for the first time since '55. And it's expected that spring meetings for each of the next three years at least will also be 10-day affairs.

As usual, many delegates were interested in new job opportunities. A look into the auditorium's main exhibition hall, where ACS set up its traditional employment clearing-house operation, showed nearly all of the 110 interviewing tables in use by employer and employee prospects.

Betting on Chemicals

The Glidden Co. (Cleveland) sees chemicals as the big growth area for the company, and is allocating its capital investment funds accordingly. This is the word from the firm's chairman and president, Dwight Joyce, who also told San Francisco security analysts recently that the company increased its capital budget 32% — to $10 million — in the fiscal year ending Aug. 31.

Over the past six years, Joyce said, Glidden's plant and equipment expenditures have amounted to nearly $50 million. And more than 64% of that has been for chemical projects, even though Glidden's Chemicals Division — a recent consolidation of the Chemicals-Pigments-Metals and Organic Chemical divisions — accounted for not quite 15% of last year's sales.

The Paint Division — the company's biggest profitmaker — scored 45% of last year's sales. The other 40% of Glidden's $195.8-million sales volume in '59 came from its Durkee Famous Foods Division. During the past six years, these divisions have been allotted $9 million and $5.5 million, respectively, of total capital spending.

Expansion Ahead: Principal chemical projects now under way: progressive increases in capacity at the titanium dioxide plant at Baltimore; construction of a titanium ore processing plant in New Jersey, to be completed by the end of '61; building of facilities for production of citronellol and other terpene chemicals, to be completed this year, and a new unit for production of laevomenthol.

Noting that last year's sales total was 16% below the '51 peak, Joyce explained that during the past several years Glidden had eliminated parts of its business that had accounted for some $61 million in yearly sales but which had been generating a pretax profit of only $887,000. Now that Glidden has disposed of those low-profit and divergent operations, Joyce concluded, "We are going to continue to grow in those areas where we feel a good profit potential exists."

COMPANIES

Bay Petroleum Co., a division of Tennessee Gas Transmission Co. (Houston, Tex.), has changed its name to Tennessee Oil Refining Co., but retains the Bay brandname for its petroleum products.

•

Food Machinery and Chemical Corp. (New York) is considering purchase of a 600-acre tract near Mount Vernon, Ala., as a possible multimillion-dollar chemical plant site. FMC officials said the company would pick up its option on the property if sufficient salt deposits are located. Drilling and exploration are under way.

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Witco Chemical Co. shareholders will vote May 19 on a proposed increase in the company's authorized stock to 2 million shares from the present 1 million. If approved, the board will consider a dividend payment of 20¢/share during the third quarter. Since the first public offering in '58, quarterly dividends of 25¢/share have been paid. The 50% distribution will increase outstanding common stock from 806,556 to 1,209,834 shares.

•

Michigan Chemical Corp. (Saint Louis, Mich.) has acquired the Paul Maney Laboratories, Inc. (Cedar Rapids, Ia.), manufacturer and distributor of ethical-drug products. The acquisition will be associated with Michigan's recently organized ethical pharmaceutical division, Pharmich Laboratories. Also recently acquired by Michigan: Metropolitan Laboratories, Inc. (Oyster Bay, N.Y.).

EXPANSION

Permanente Cement Co. (Oakland, Calif.) is investing $16 million in new and improved facilities this year, compared with $10.3 million in '59. Soon to be completed: a gypsum products plant in New Mexico and a new cement manufacturing facility in Honolulu.

•

Caustic Potash: Construction of Canadian Industries Ltd.'s $500,000 caustic potash plant at Cornwall, Ont., begins this week. Constructor: Fraser Brace Engineering Co. (Ontario) Ltd.

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Asphalt: Armor-Coat Finishing Co. will construct facilities at the new, $1.5-million industrial development site planned for the Mississippi River in St. Paul, Minn. The project will include a barge and truck terminal, a distribution center for asphalt, asphalt oil and an asphalt mixing plant.

•

Pulp and Paper: Menasha Wooden Ware Co. is building a 125-tons/day pulp and paper plant at Coos Bay, Ore. Construction of the new, $5-million neutral sulfite facility is expected to begin this spring and is slated for operation in spring '61. Source of water for the processing: the sand dunes of the bay, expected to provide the plant with 2.5 million gal./day of fresh water.

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Acetate, Liquid Sulfur Dioxide: Monsanto Chemical Co. (St. Louis, Mo.) is expanding by 20% its plastics division's acetate sheeting facilities at Springfield, Mass. And on May 1, the company expects to start up its expanded liquid sulfur dioxide facilities at Monsanto, Ill. The expansion more than doubles the manufacturing capacity for liquid sulfur dioxide at that point, and incorporates latest technology. Exact capacities were not disclosed.

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Pesticides: Interprovincial Co-operatives, Ltd. (Winnipeg, Can.), plans to start construction within a year of western Canada's first basic chemical pesticide plant, in the Alberta-Saskatchewan area.

FOREIGN

Engineering/England: Three competitive construction and engineering firms will join forces to win contracts abroad. The new company—Chemical Works Projects, Ltd.—was formed by P. G. Engineering, Ltd., Humphreys & Glascow, Ltd., and Simon Carves, Ltd. Objective: contracts for large fertilizer and chemical projects.

•

Investment/Italy: A total of 24 investments poured $6.4 million of foreign capital into Italy during the first two months of this year. Fourteen were for new projects, with the U.S. topping the list of investors, followed by the United Kingdom. Distribution: $3.2 million, oil; $1.6 million, paper; $800,000, chemicals and pharmaceuticals; $320,000, building, electronics, textile and wood industries; and $480,000, hotels.

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Vinyl Foam/Brazil: Vulcan Artefatos de Borracha S.A. (Rio de Janeiro) has been licensed by Chemetron Corp.'s Girdler Process Equipment Division, overseas licensor of Union Carbide Plastics Co.'s Elastomer process for vinyl foams. Girdler has now licensed 12 overseas firms.

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Petrochemicals/Japan: Nippon Mining Co. Ltd. has been licensed by Houdry Process Corp. (Philadelphia), to construct a 6,000-bbls./day catalytic reforming unit and an 8,000-bbls./day hydrodesulfurization unit in Mizushima, Japan.

•

Petroleum Products/Singapore: Maruzen Oil (Tokyo, Japan) has completed negotiations with Singapore government for a 20,000-bbls./day refinery to be built by Maruzen and Toyo Menka Kaisha, Japanese machine tool manufacturers. Completion of the $7-million plant is set for Nov. '61. The government will lease land for the refinery and grant a five-year tax exemption.

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2) Clark dealers, with the aid of a national service personnel training program, assure you that the best trained mechanics in the industry will service your equipment. These highly trained specialists perform a minimum of 22 separate inspections on every truck serviced. They not only perform the normal jobs of greasing and oil changes, but also make all necessary adjustments to your equipment. Most important, they report the condition of your machines, anticipating failure before it happens. As a result . . . *downtime* is drastically reduced.

3) A Clark Dealer Continuous Maintenance Program gets you out of the repair and maintenance business. It eliminates the need for special tools, parts stock and use of valuable plant space for servicing facilities.

4) A Clark Dealer Continuous Maintenance Program is economical. It actually costs less than similar service on your own automobile. This is an inadequate comparison, however, when you consider the small cost of preventive type maintenance to the cost of *downtime*.

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Chemical Companies Fend Off Big Unions

Significant Election Results So Far in '60

Companies	*Unions*	*Results*
Du Pont, Savannah River, Ga.	Savannah River Atomic Trades Council (AFL-CIO)	No Union
Dow, Rocky Flats, Colo.	Denver Metal Trades (AFL-CIO), UMW	Metal Trades
Esso, Baton Rouge, La.	IIWA (clerical)	IIWA
Du Pont, Belle, W. Va.	OCAW	No Union
Du Pont, Antioch, Calif.	OCAW	No Union
Du Pont, La Porte, Tex.	OCAW, Machinists	No Union
Esso, Bayway, N.J.	OCAW, IIWA, Teamsters, Operating Engineers	IIWA
Atlas Asbestos, Montreal, Que.	OCAW, ICWU	OCAW
Susquehanna-Western, Riverton, Wyo.	OCAW, UMW	No Union
Thiokol, Brigham City, Utah	OCAW	No Union
Union Carbide Nuclear, Uravan, Colo.	UMW	No Union
American Cyanamid, Mobile, Ala.	UMW, ICWU	UMW
Olin Mathieson, Saltville, Va.	UMW, Independent	UMW
Celanese, Narrows, Va.	UMW, Pipefitters	UMW
American Cyanamid, Farmville, N.C.	UMW	No Union
Reichhold, Hampton, S.C.	ICWU, Teamsters, Operating Engineers	No Union
Allied Chemical, Brunswick, Ga.	ICWU	No Union
Hercules Powder, Rocky Hill, N.J.	ICWU	ICWU
U. S. Gypsum, Birmingham, Ala.	ICWU	ICWU
National Carbide, Keokuk, Ia.	ICWU	ICWU
U. S. Gypsum, Torrance, Calif.	ICWU	ICWU

Abbreviations:
UMW—District 50, United Mine Workers
ICWU—International Chemical Workers Union
OCAW—Oil, Chemical & Atomic Workers Union
IIWA—Independent Industrial Workers Assn.

Labor's Record Hints Stable Year Ahead

Employees in the majority of chemical process plants under fire from union organizers in '60's first quarter have either shunned unionization or turned to independent unions for representation. In the same period, chemical unions have registered wage increases for their members this year averaging 8-9¢/hour.

These trends show up in analysis of union elections at 21 chemical process plants (*above*) and of contract and wage-reopening settlements between chemical management and unions at 68 plants (*p. 30*). Labor leaders and management expect these trends to be borne out through '60.

Organizing: Although turndowns have, in general, outnumbered major union acceptances, closer examination of the results indicates that most of the suffering is being done by Oil, Chemical & Atomic Workers Union, This despite its efforts to strengthen and reorder its organizing machinery and to change its technique from a shotgun to a rifle approach. A look at the records of District 50, United Mine Workers, and International Chemical Workers Union, shows each with more wins than losses in chemical process plant elections.

OCAW's ill luck, according to its new director of organization Carl Mattern, is due largely to managements' use of "methodical, well-planned resistance to unions."

Doing Better: Other chemical unions are faring somewhat better. ICWU has racked up several gains in organizing, claims to have had seven wins and seven losses in the U.S. and Canada. Several of those elections were not in the chemical industry.

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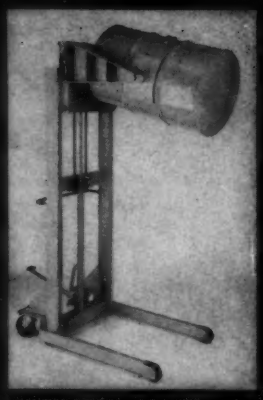

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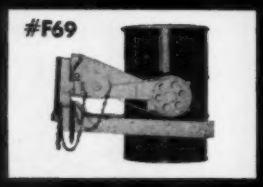

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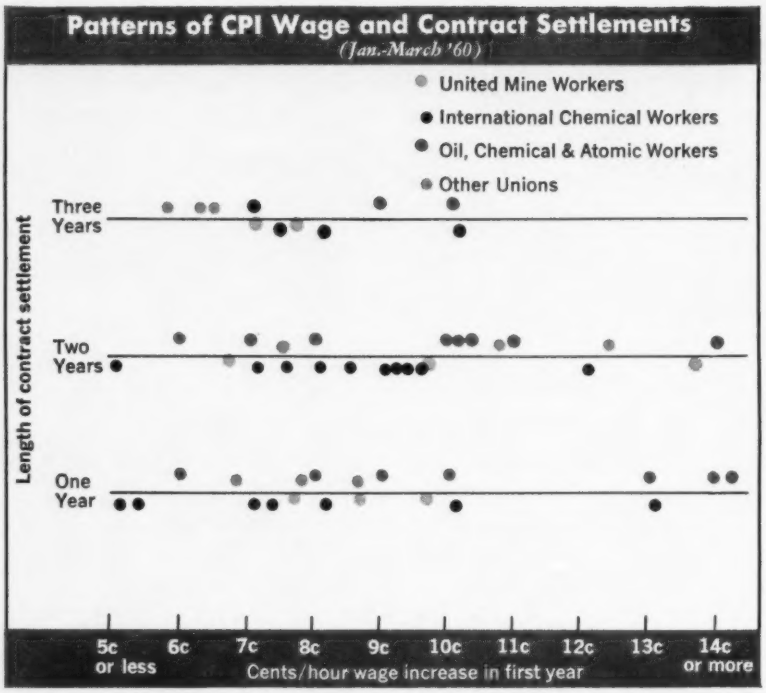

watching most closely, however, is UMW's District 50. Since the Landrum-Griffin Act absolved union leaders from taking a non-Communist oath before availing themselves of National Labor Relations Board Services, UMW has been actively going after official certification. Some managers, however, think that UMW will not organize much faster than in the last several years, but that now NLRB recognition will enhance its prestige, result in more publicity. Industrial relations people point out that UMW, unlike other chemical unions, leans toward quiet organizing, minimum international activity, maximum service to locals.

Organizing Outlook: Management expects little change in the pace of union organizing activity. It looks for UMW to continue steadily encroaching upon other union territories, while OCAW and ICWU, both hampered by low finances, battle to retain what they have. Moreover, both the latter are embroiled in jurisdictional problems stemming from running warfare between AFL-CIO's Industrial Unions Dept. and its Metal Trades Council, and also from incursions by UMW and the Teamsters. Reports from OCAW and ICWU indicate no pickup in organizing activities.

These patterns are borne out on the national level. Labor organizing has become less effective over the past several years. Latest NLRB figures, for example, show that unions last year won only 57% of representation elections, and this average has been dropping—it was 68% in '55. Since '45, although union membership has climbed 24%, it has remained at 35.8% in proportion to nonagricultural employment.

The reasons for this hold true in the chemical process industries:

- Organizing plums for the most part have long since been picked; unions are now running into tougher management; their targets are smaller pockets of workers where employers have greater control.
- Unions still haven't been able to effectively organize Southern workers nor have they yet learned the best ways to win white-collar workers. Both are considered rich targets.
- General prosperity makes unions less appealing to nonunion workers. Automation and smaller work forces gives industry leverage against organizing and contract demands.
- Racketeering revelations by the McClellan committee have been used effectively to block organizing.
- Interunion rivalries within the AFL-CIO have stalled organizing.

Wage Settlements: Wage settlements

Seqlene* Sequestrants:

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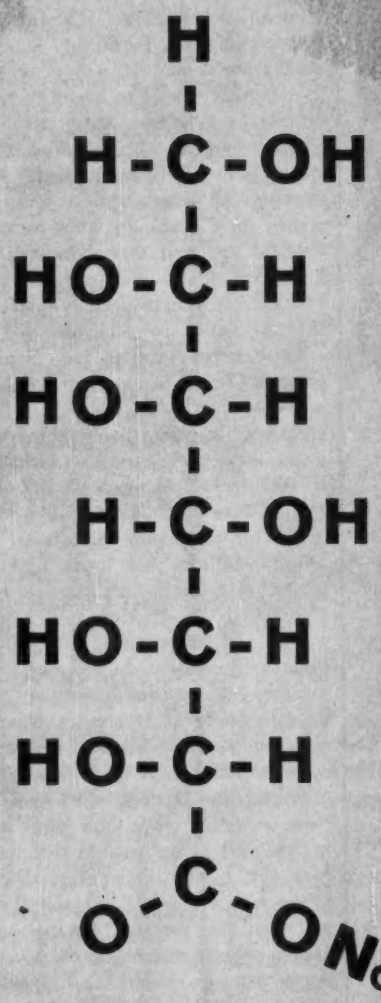

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Economical Seqlene Sequestrants are a unique combination of sugar acid salts.

Used industrially to control metallic impurities by forming water-soluble complexes with the metal in an ionized state, Seqlene Sequestrants are particularly effective in strong alkaline solutions. They sequester not only calcium and iron but other polyvalent metals as well.

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While their most obvious uses are in the general areas of alkaline cleaning, derusting, and water treatment, their versatility suggests a wide range of applications in a number of different fields.

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If you need a powerful yet economical sequestrant for alkaline systems, perhaps one of the Seqlene Sequestrants will fit your requirements. They are available in both dry and liquid forms. For further information and sample, send request and a brief description of application to:

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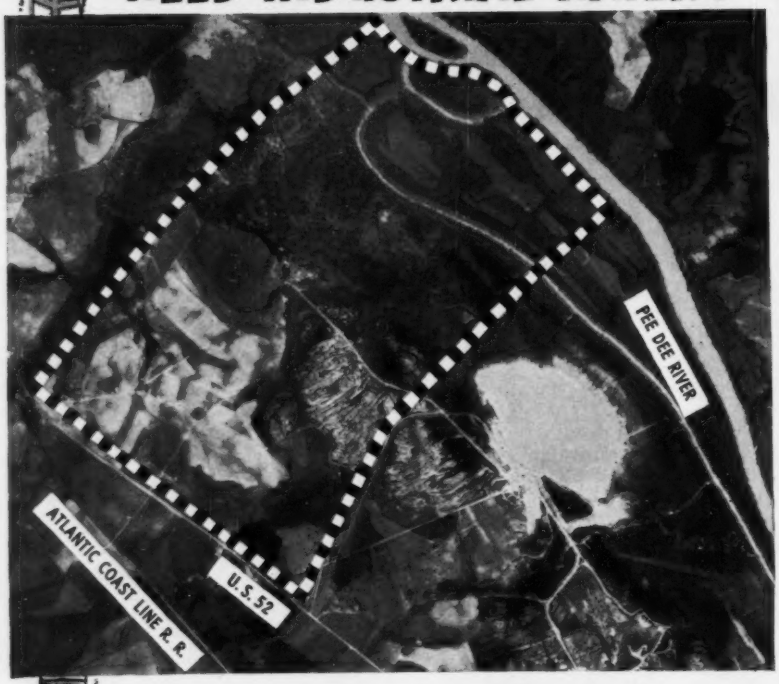

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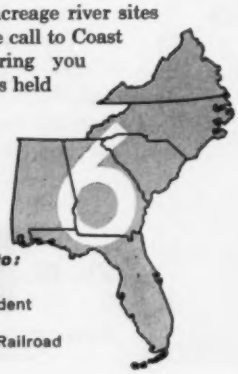


ATLANTIC COAST LINE RAILROAD

Direct inquiries to:
R. P. JOBB
Assistant Vice-President
Department K-40
Atlantic Coast Line Railroad
Wilmington, N. C.

so far this year fall mostly between 7½¢ and 10¢/hour—average 8.8¢—for the '60 increase. In wage-reopeners, settlements average 8½¢, ranging mostly between 7¢ and 10¢. Twenty-five contracts are for two years, 20 for one year, only 12 for three years.

Precommitted wage increases for two- and three-year contracts average 8¢/hour for the second year, 7¢/-hour for the third year. A handful of the longer contracts contain wage-reopening clauses.

According to industrial relations management, most fringe activity is in matching new contracts to regional or area conditions. Most prevalent changes: vacation liberalization (four weeks after 20 years, three for 15), increased holidays (from seven to eight), more company absorption of medical and pension payments, and higher premium and overtime pay. In some cases, management is seeking to drop cost-of-living clauses.

Oil Pattern: Although the moderate wage gains of the steel strike have probably had some impact in the chemical industry, it's expected that upcoming negotiations in the oil industry will have even more significance.

A CHEMICAL WEEK survey of major oil companies indicates a determination this year to sit tight on wages, resorting where necessary to "individual classification rate adjustments." Oil companies claim tough times with reduced throughputs, high inventories, say their operations are close to the break-even point. They're in no mood to absorb increased wage costs such as the 5% hike of last year.

Negotiation Outlook: CPI management looks for wage settlements during the rest of the year to run about even with those to date. Hardest area to reach agreement in, executives say, will be the security benefits—disability wage payments, medical coverage, pensions, severance pay, guaranteed annual wages. They blame steel for having made a settlement relieving employees of any responsibility for the cost of such benefits, expect chemical employees to seek the same status.

So far, '60 is shaping up as a moderately tough year for unions in the chemical industry. Interunion strife, shaky financial foundations, and good-but-not-improving business prospects add up to slow organizing gains, unspectacular contract settlements.

Progress Report....

— 1-Pentanol
— CELLOSOLVE acetate
— Emulsified buffing compounds

High-purity, straight-chain alcohol

A rose is a rose is a rose – except in some perfumes when the desired scent is contaminated by low-purity alcohols. To eliminate unwanted chemical odors in your perfumes, flavorings, and pharmaceuticals, you can formulate them with CARBIDE's high purity 1-pentanol.

1-Pentanol is now being produced by CARBIDE in two grades of purity – 90% and 98%. The former contains 90 to 95% straight-chain 1-pentanol; the latter, 98% or better. In each case the balance is branch chain primary amyl alcohol. 98% grade is the first commercially-available 1-pentanol of such high purity. Either grade gives fast, complete reactions and high production efficiency. There are no competing side reactions, no by-products, and no un-reacted residues. In addition, 1-pentanol is the most reactive of all primary amyl alcohols. CARBIDE's 1-pentanol is a water-white liquid with a boiling point of 138° C. It is the highest boiling of all the isomeric five-carbon alcohols. Derivatives are generally of comparatively low volatility. The solubility of 1-pentanol in water is 1.8% by weight at 20° C. These properties, both lower than those of branched or mixed amyl alcohols, are important in esters and other derivatives used as plasticizers, solvents, extractants, lubricants, and agricultural chemicals. As lubricants, such esters provide the low viscosity needed at extremely high altitudes.

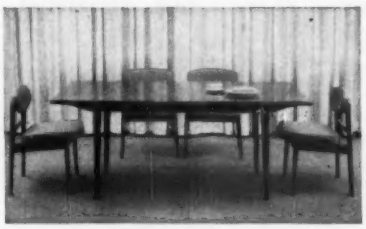
Resins produced from monomeric straight-chain derivatives of 1-pentanol are reportedly more crystalline than those made from isomeric derivatives. This has advantages in acrylates, methacrylates, silicones, and polyesters. Metal salts, phosphorous compounds, and other inorganic derivatives used as catalysts, additives, or inhibitors for fuels, oils, paints, and other materials may also gain advantages from these special amyl alcohols. 1-pentanol is also suggested for trial as an intermediate in the production of coupling agents for lubricants, alkyl nitrates as ignition promoters, ester plasticizers, and polyvalent metal amylates as epoxide curing agents.

For a technical bulletin listing properties, analyses, and suggested uses, check the coupon on this page.

Solvent saves time in furniture finishing

One of the most versatile of CARBIDE's lacquer solvents is CELLOSOLVE acetate. Because of its exceptional flow-out properties, it is widely used in formulating furniture and metal lacquers.

Lacquers containing CELLOSOLVE acetate require only minimal sanding or rubbing, helping to lower production costs.



Slow evaporation rate and improved flow-out ability make CELLOSOLVE acetate ideal for brushing lacquers, too. It provides good blush resistance and high gloss, whether used for conventional spraying, hot-spray finishing, "high-low" finishing, or brushing.

Further information on CARBIDE's esters is contained in the booklet, "Esters." Suggested applications include those for plastics, dyes, perfumes, and pharmaceuticals. Check the coupon for your copy.

Emulsified buffing compounds

Emulsion buffing compounds have several advantages over bar-type compounds for metal finishing. With CARBIDE's triethanolamine as the soap-forming emulsifier, compounds are quickly made ready for use and provide good flow properties. They are stable, less viscous on agitation, and hold the abrasive suspended even while stored. The emulsion is easily removed by rinsing.

Triethanolamine buffing emulsions have demonstrated savings of 25% in buffing time. The buff is evenly coated and gains one-third longer service life. Emulsion buffing compounds are economical, since only half the amount of the bar material is used, or less. The emulsion is non-flammable.

A CARBIDE Technical Representative can furnish you with information on formulation of buffing compounds with triethanolamine. Other information on ethanolamines is contained in a new booklet, "Alkanolamines and Derivatives." It includes a listing of properties, applications, and handling methods. Check the coupon for a copy.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

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CW PHOTO—ED WALLOWITCH

St. Regis' Adams: Building an empire '60 style—fast, diversified.

Paper Midgets Make a Giant

For the 11th time in a year, St. Regis Paper Co. has bought a company—a near one-a-month buying spree that may be something of a record in the chemical process industries. Last week St. Regis put its seal on the Central Waxed Paper Co. of Chicago.

Although big-company acquisitiveness is being closely eyed by federal agencies, St. Regis isn't worried. Says company President William Adams: "It's all a part of our growth plan."

St. Regis calls its purchases "integrations" and "diversifications," has no particular policy—such as prior investigation — regarding federal scrutiny of acquisitions, Adams says. "Because of the geography and the new fields—for us—that are involved," he explains, "we're far from any violation of commission statutes that center around monopoly."

Planned Expansion: Adams describes the company's expansion program—including its 19 acquisitions over the past five years—as taking a three-avenue approach:

- Enlargement of raw-material sources—e.g., via the purchase of timberlands.
- Expansion of current product lines into new geographic areas, as in purchase or construction of manufacturing and marketing facilities.
- Expanded end-products via diversification of manufacturing processes using basic raw materials the company already makes.

From the stockholders' standpoint, Adams believes, diversification has been a stabilizer to the company's earnings—with little dilution of equity.

Easy Way to Acquisition: Unlike many CPI companies that have special teams or executives who find, investigate and effect major purchases, St. Regis has no acquisition specialists, other than a full stable of lawyers. "Our new associates have come to us, for the most part," Adams explains, "so we haven't had to go looking." Often, these are small, family-owned companies needing greater sales strength for their products.

The purchases have worked smoothly, since—as Adams points out—the company tries to acquire only outfits with capable management personnel and good organization. "We expect companies to carry on without too much specific control from us. With respect to terms of acquisitions, we have always made a stock-for-stock exchange."

More Growth? St. Regis' "open-door policy" has already put it in the position of claiming to be "probably the most diversified company in the paper industry, in products, and certainly the most diversified, geographically."

As for continuing acquisitions at the current rate, Adams simply says, "We have no formalized plans for the future. There are too many influencing circumstances. But, we're not closing the door."

Needed: Top Dollar Men

Chemical companies will be looking for substantially more high-paid executives than business in general will seek during the rest of '60, if this week's predictions from a New York management recruiting firm hold true. The majority of $10,000 to $100,000/year vacancies in chemical companies will be for sales management executives, but management expects to find its greatest personnel difficulties in meeting engineering executive requirements.

Based on a relatively small sampling—145 firms, representing 29 industries—a recent poll by Executive Manpower Corp. indicates a need for about 2.5 top men per company in all industry during the next six months, a drop from last year's 3.2 men. Anticipated needs for the 15 chemical companies in the survey are for 49 jobs, averaging 3.3 men per company.

The above-average need for manpower is the only significant deviation registered by the participating chemical companies from all-industry findings on the survey. Reports from other CPI firms—e.g., drugs, toiletries, pulp and paper, rubber and petroleum —represented too small a sample for analysis.

Source of Supply: Among the chemical companies, the number of replacement jobs and newly created positions was about equal—47.2% and 52.8% of the total, respectively. In listing sources of executive help, companies said they preferred getting them from (1) within the company, (2) personal recommendations, (3) advertising and management recruiters

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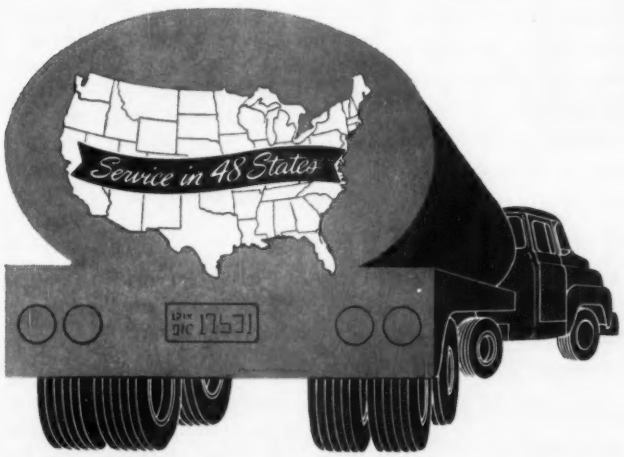

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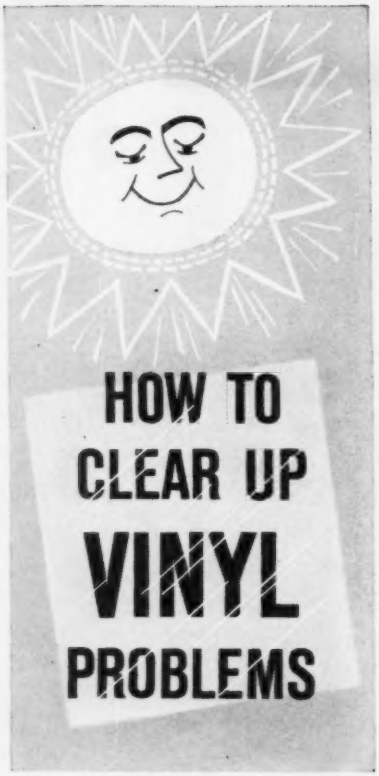

Exposure to sunlight (ultra violet) normally brings on yellowing and clouding in vinyl film and sheeting. The high heat of the production process itself has the same bad effect.

But there's a happier ending where stabilizer compounds containing V-C TRIALKYL PHOSPHITES are used. These hard-working phosphorus chemicals help keep vinyl crystal clear... prevent yellowing and the mechanical deterioration that follows ... make it possible to use higher heat for longer periods in processing.

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TRIALKYL PHOSPHITES

ADMINISTRATION

(equal), (4) employment agencies, (5) competitors. During the past year, the chemical companies selected 61.9% of their executives from within the company, the rest from outside.

The majority—29—of the available jobs among chemical firms will fall in the $10,000 to $15,000 category. However, two companies are looking for manufacturing or production managers, whom they'll pay salaries up to $40,000.

LEGAL

Narcotics' Licensing: New federal legislation for the first time requires licensing — rather than mere registration — of manufacturers of all narcotics, and brings synthetic narcotics under federal controls. Industry and government both favored the bill. The President is expected to sign the measure after technical adjustments.

Licensing provides the Treasury Dept.'s narcotics agents with more authority to control standards of manufacturing and quotas. The new synthetics, such as Demerol and Methadone, will now be controlled the same way as are morphine, codeine and other narcotics produced from natural sources such as opium.

The measure gives the Commissioner of Narcotics authority to add or remove certain narcotics from the list of those that can be purchased without prescription. Previously, changes in the exempt list had to have approval of Congress.

The measure also formalizes the cooperative arrangements through which the U.S. sets quotas on manufacturers and reports to the United Nations.

•

Gee and Whee!: There's a difference between Gee and Whee!, said the Trademark Trial and Appeal Board in a recent ruling in Washington, D.C. Gee, in this case, is a household cleanser manufactured by Armour & Co. (Chicago), and Whee! is a liquid laundry detergent, manufactured by Texize Chemicals, Inc. (Greenville, S.C.), whose attempts to trademark the product were challenged by Armour.

Since both products were found to be similar, chemically, the appeal board had to determine whether the names would cause confusion in trade. "Whee! and Gee are distinguishable in both sound and appearance," the board found, "and while they are both exclamatory slang expressions, they have distinctly different meanings, Whee! being used to express delight, and Gee being expressive of surprise." Conclusion: no likelihood of confusion, mistake or deception of purchasers.

•

Offshore Accident: Pure Oil Co. and Loffland Brothers Co., a drilling firm, were found liable for injuries sustained by an employee working on an offshore drilling site in the Gulf of Mexico. A federal jury in Louisiana made the award of $75,000 in damages to the injured worker, who had been an employee of the drilling company under contract to Pure Oil, the site owner. The employee had sued for $220,000.

KEY CHANGES

Howard R. Medici to chairman of the board, **Glenn L. Pitzer** to president, Visking Co. division, Union Carbide Corp. (New York).

Arthur F. Brown to board of directors, Hercules Powder Co. (Wilmington, Del.).

L. H. LaMotte to board of directors, Anken Chemical & Film Corp. (Newton, N.J.).

Mrs. Gabrielle M. Hearst to president, Flamort Chemical Co. (San Francisco).

D. E. Read to president, Industrial Cellulose Research Ltd. (Hawkesbury, Ont.).

Frank Seeland to president, Dr. LeGear, Inc., subsidiary of S. B. Penick & Co. (New York).

E. L. Kurth to chairman of the board, **R. W. Wortham, Jr.,** to president, Southland Paper Mills, Inc. (Lufkin, Tex.).

Hugh C. Land to vice-president and **Lee H. Clark** to group vice-president, East, Pennsalt Chemicals Corp. (Philadelphia).

Frederic D. Randall to vice-president, industrial and home products marketing, Elanco Products Co., division of Eli Lilly & Co. (Indianapolis).

William D. Miller to vice-president, Aluminum Foils, Inc. (Jackson, Tenn.).

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An easily handled dry acid, particularly useful where more reactive reagents cause side reactions or destructive effects resulting in yield loss, odor or color in the end product. Sulfamic is particularly valuable for sulfating mono-(primary and secondary) and poly-hydric alcohols and phenols, as well as amines, phenolic ethers and for sulfonating unsaturated compounds. Write for technical product bulletin A-2818.

2 Sulfuric Acid—H_2SO_4:

Widely used for sulfonations because of low cost. Excess usually required to get favorable yields. Available in all strengths up to 100%. Write for shipping, handling and storage information bulletin A-10340.

3 Chlorosulfonic Acid—$HClSO_3$:

Useful for sulfating or sulfonating alcohols, phenols, amines and carboxylic acids. Reactions involving chlorosulfonic acid normally go to completion by evolving HCl. Another advantage: By using solvents for dilution, good reaction control is achieved. This control reduces side reactions and produces higher-quality products. Write for technical product bulletin A-4348.

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Now from Du Pont, one convenient source, you can choose one or a complete range of sulfonating and sulfating agents, sulfur trioxide, oleum, and sulfuric, chlorosulfonic and sulfamic acids. In addition, Du Pont welcomes inquiries for commercial quantities of tailor-made mixtures containing SO_3, such as special-strength oleums and SO_3-chlorosulfonic acid mixtures to meet individual requirements. For more information on this or for technical literature noted at left, write:

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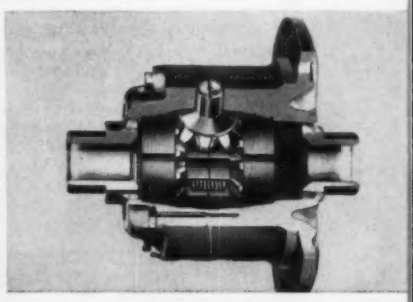
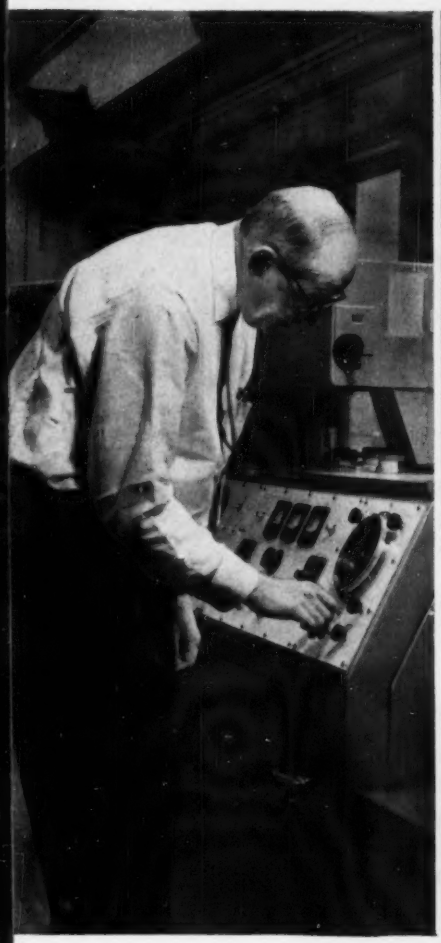
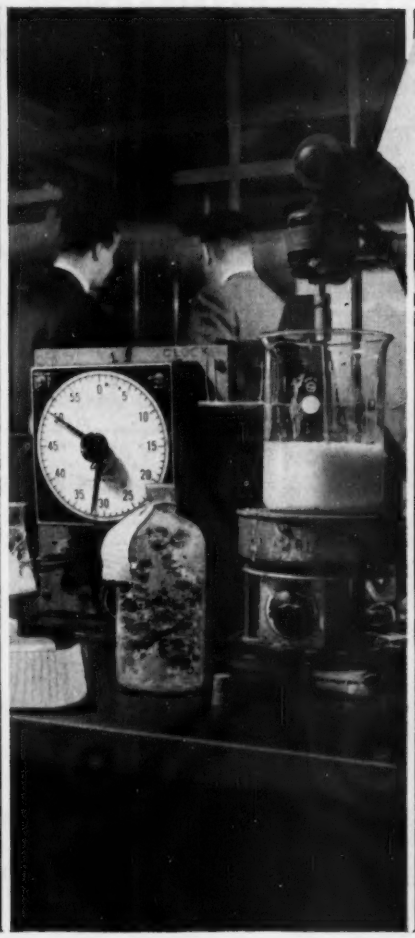
ULTRAWETS® Alkyl aryl sulfonates are important in the Atlantic family of quality petrochemicals to answer your problem for better quality in literally hundreds of detergent and cleaning formulations from shampoos to floor cleaners. Other examples of their versatile application are as surface-active agents for textile processing; for stabilizers in latex paint; for frothing agents in the manufacture of gypsum board; and for cleaning metal surfaces.

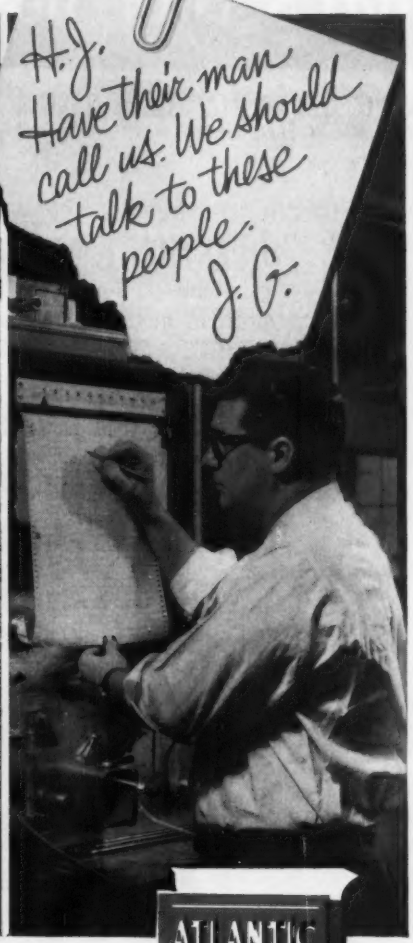


TECHNICAL EICOSANE This hydrocarbon with the formula $C_{20}H_{42}$ is a paraffin containing essentially 20 carbon atoms. Has a low melting point (96.5° F). Its molecular structure enables it to chlorinate readily, producing compounds of unusual stability having low viscosities with high chlorine content. Typical uses among many applications are: flameproofing compounds, chemical intermediate for gear lubricants and plasticizers.

and check to be certain that every standard is being met





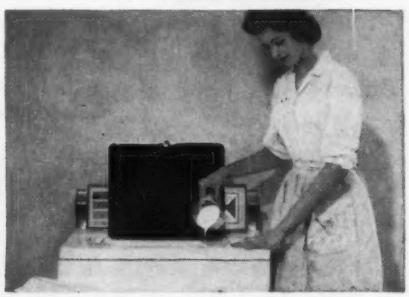


on both with ATLANTIC PETROCHEMICALS

ATLANTIC PETROLEUM CHEMICALS

OLEFINS The olefins are used in the synthesis of rubber accelerators which promote faster curing of the rubber, thus speeding up production; as raw materials for producing antioxidants which inhibit dangerous drying out effects caused by oxidation and to promote heat and light stability of tires. Olefins are also used to make quality resins for heavy-duty varnishes, germicides, insecticides, dyes and surface-active agents.

ANHYDROUS AMMONIA This chemical raw material has a wide variety of uses for quality products. To mention a few of the applications: a valuable plant nutrient either applied directly to soil or used to manufacture fertilizers; to produce explosives and to make oxidizing agents essential in the chemical synthesis of plastics; as a source of hydrogen for the bright-annealing of stainless steels and a nitrogen source for nitriding alloy steels.



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. . . a quiz for Chemical Executives who want to keep posted

QUESTION 1. In 1959, 28 plants in the United States were producing ethylene—the hydrocarbon intermediate which is way ahead of all others both in quantity produced and in versatility. What was the estimated total U. S. capacity for this valuable chemical in 1959?

a — 3.7 Billion Pounds

b — 4.9 Billion Pounds

c — 5.6 Billion Pounds

d — 6.4 Billion Pounds

QUESTION 2. How many of the U. S. ethylene plants were designed, engineered and constructed by the Lummus Company?

	PLANTS	CAPACITY
a	3	.4 Billion lbs.
b	5	.6 Billion lbs.
c	7	.8 Billion lbs.
d	9	1.0 Billion lbs.

ANSWERS: 1. *The answer is (c)—5.6 billion pounds, according to* Chemical Week's *Report on Ethylene, May 9, 1959.*

2. *Again the answer is (c). In the last 10 years Lummus has 7 Ethylene plants to its credit in the U. S. alone with a combined capacity of .8 billion lbs. Lummus' world-wide total is 13, with a combined capacity of over a billion pounds per year. For ethylene projects, or any type of process plant, call on Lummus' 50 years of experience in design, engineering and construction.*

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Washington
Newsletter

CHEMICAL WEEK
April 16, 1960

The "no cancer" clause will stay in the color additives bill now moving through Congress, if the testimony of a panel of scientists is indicative.

The panel, composed of a dozen university and government experts, discussed the Delaney amendment before the House committee. Industry was not represented. Three scientists from the National Cancer Institute agreed that since science knows so little about what causes cancer, the flat ban on any carcinogen should stay. The others were not so sure. They felt there are grounds for disagreement on just what is a carcinogen—depending on how it is tested and for what use it is intended.

Salt injected under the skin, for instance, causes cancer—but does this make it a cancer-causing agent? The latter group felt some leeway should be allowed for scientific discretion in individual cases.

But no congressman is likely to stand up for a softening of the Delaney amendment with such weak support from scientists. One possible modification under discussion: setting up a scientific board either to advise FDA in borderline cases or to act as a board of appeal. (There is now such an advisory board on pesticides.) At any rate, Chairman Oren Harris (D., Ark.) promises that the color bill, already through the Senate, will clear Congress before the session is over.

•

Chemical companies with high-ranking ex-military officers on payrolls may not have to alter their dealings with the Pentagon too much as a result of the "influence peddling" bill passed by the House. It is considerably milder than the measure pushed by Rep. Hébert (D., La.), who conducted the headline-making probe of the issue last year.

The bill bars retired officers from "selling" to the military for two years after retirement, with penalty of court martial and withholding of retirement pay. Contractors must register the officers, with suspension of contract payments being the penalty for failure to do so.

The bill clearly prohibits direct selling, but this has been banned anyhow. It does not necessarily stop "indirect" selling, however—the kind of influence peddling the investigators were after. Much now depends on how "selling" will be interpreted. The bill may yet be strengthened, of course, in the Senate.

•

A flare-up over conduct of the Kefauver drug price probe reflects increasing sensitivity of the Republicans on the medical care issue. They see the Kefauver investigation as bolstering support for a plan to pay medical costs of the aged.

GOP Senate Leader Everett Dirksen (R., Ill.) is kingpin in both issues. He is ranking Republican on the Kefauver committee and

Washington Newsletter

(Continued)

also a member of the special committee on the aged, which is pushing the Forand bill for adding medical insurance to Social Security. In hearings of that committee last week he led the fight against what he called "stinking" charges that the Administration is unconcerned with old folks.

Controversy on the Kefauver committee centers around the chairman's plan to call a list of doctors who oppose "high" drug prices but not to call the American Medical Assn. until much later. Dirksen branded the hearings in advance as "unbalanced and unobjective." One object of this week's session: to try to prove that drug companies' research is more developmental, aimed at the commercial market, than basic.

•

A new lead-zinc tariff battle looms in Congress and within the Administration. In the aftermath of Tariff Commission's inconclusive split-vote refusal to recommend new restrictions on imports, this much is clear:

Domestic mines will push for a legislated tariff boost on imports of both ores and products. The strength of their drive depends entirely on how well three dissident groups in the industry heal their breach over what the new rates should be. The three groups are the small-mine operators, who also are pressing for a special price-support bill; the smelters; and the industry's emergency committee, which includes the larger operators.

The Administration hopes to replace existing quotas with a slightly higher duty rate on its own without Congressional action. But its problem is where to fix the compromise rates so as to mollify both domestic producers and foreign suppliers.

•

Complete reversal on patent policy in government space work has been taken by the House Space Committee. It has approved 14-4 an amendment allowing a contractor to keep patent rights (except for royalty-free government use) on any developments growing out of research done on a space contract.

Industry has fought the provisions of the 1958 law setting up the Space Agency. This law denied patent rights to a company unless the agency made special dispensation. NASA officials convinced the committee they were having trouble placing contracts. A company which already had patent advantages in space-related work sometimes refused to work under an NASA contract, for fear of jeopardizing its patent position. Another complication was that since the Pentagon allows companies to keep patent rights, a company doing work for both Pentagon and NASA was working under two different patent arrangements.

The committee's reversal is sure to arouse the ire of the Senate Patents Subcommittee under Sen. Joseph C. O'Mahoney. The Senate group has been studying government patent policies for two years in hopes of establishing a uniform policy among all agencies, which would guarantee the widest possible spread of the fruits of government-financed research.

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New Measure for Safety

When the separatory-funnel stopcock is opened by the technician (pictured right) at Du Pont's Chambers Works (Penns Grove, N. J.), out will pour ingredients for better plant safety. The procedure, used to set up weekly safety checks, is part of a new program that has helped reduce by about 20% the plant's "submajor" injuries — injuries that do not involve lost time, but hamper the injured worker in his duties.

The program is based on sound statistical techniques, not gimmicks that limit the life of most new safety programs. Its aims: to keep an unbiased finger continually on the plant's safety pulse, detect unsafe conditions and working attitudes before they result in actual injuries—and do it with economy of supervisory time.

From Area to Plant: It was with these goals in mind that Freon-area chief supervisor Frank Hodges and his superintendent, Joe Richmond, approached area statistician Art Hawkinson in '56. From their discussions came a trial program based on the statistical techniques of random sampling and control charts, used for a number of years in product quality control. The program was put through a plantwide trial in the spring of '57, has since been proving its worth as a regular part of the safety program.

From beginning to end, the program runs contrary to those usually found in a plant. It relies on (1) quick, unannounced, random checks of plant areas instead of thorough inspection of entire plant; (2) do-it-yourself inspections by area supervision rather than inspections by plant safety engineers; (3) rating of an area's safety performance by injuries that might happen rather than by actual injuries. Here's how it works:

The major plant areas (the Chambers Works includes 24 in its program) are divided into sections based on supervisory responsibility. Each section is subdivided into segments that can be safety-checked by a five-man inspection team in 15 minutes.

Each week, the statistical-control clerks in the areas pick capsules at random to determine the following: date and time of the inspection, the five members of the inspection team, the segment of each plant area that will be visited and the order in which the segments will be visited.

Capsules drawn from funnel determine makeup of safety team.

The inspection team is informed in advance only of the date and time of the inspection. Workers aren't told.

At inspection time, each designated segment of the area is inspected for 15 minutes by four members of the team, working as a group, seeking unsafe conditions and acts. The fifth member of the team talks with workers in the area to gauge morale.

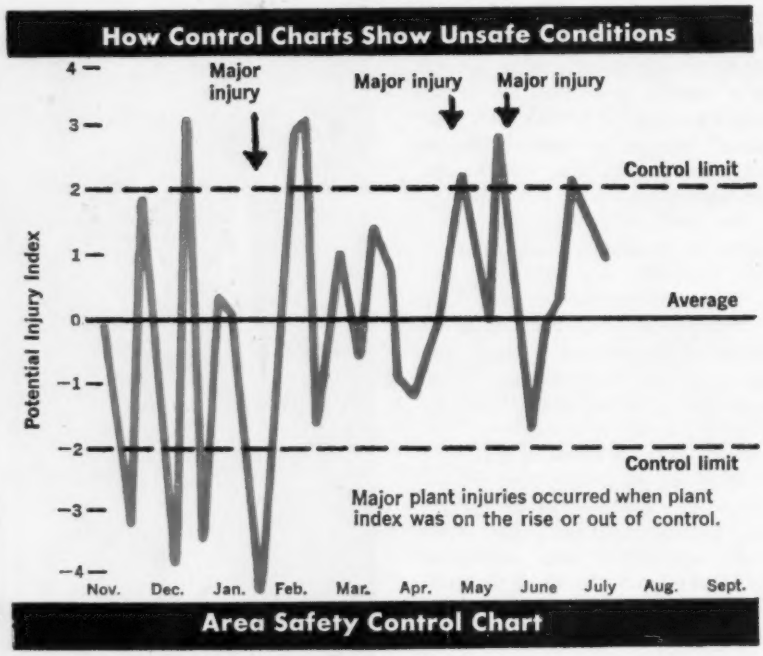
At the end of the inspection period, the cases are tabulated. Questionable ones are settled during a five-minute discussion period. A copy of the list is given the foreman of the section for action. It might include such offenses as a hose left across a walkway, an operator turning a valve wheel without his gloves, a sealed valve with a broken seal wire.

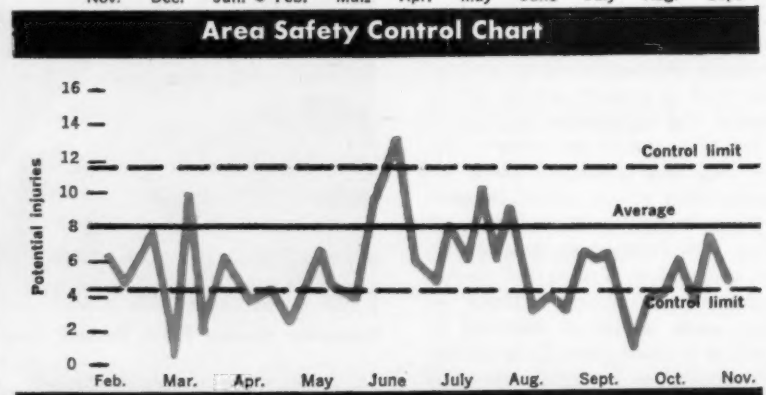
The average number of unsafe acts

and conditions for the area is reported to the statistical-control clerk, who plots it on a control chart (*below*). The information is then posted in the plant area on a master control chart mounted on a billboard. This gives each employee a chance to view the safety atmosphere in which he is working.

The billboard has a traffic light that calls attention to safety conditions — it burns green when the area is within preset control limits, yellow when the area is approaching an out-of control period, red when the area is out of control.

A program is run 8-10 weeks before any control limits are placed on the area's control chart. Then the average, and upper and lower control





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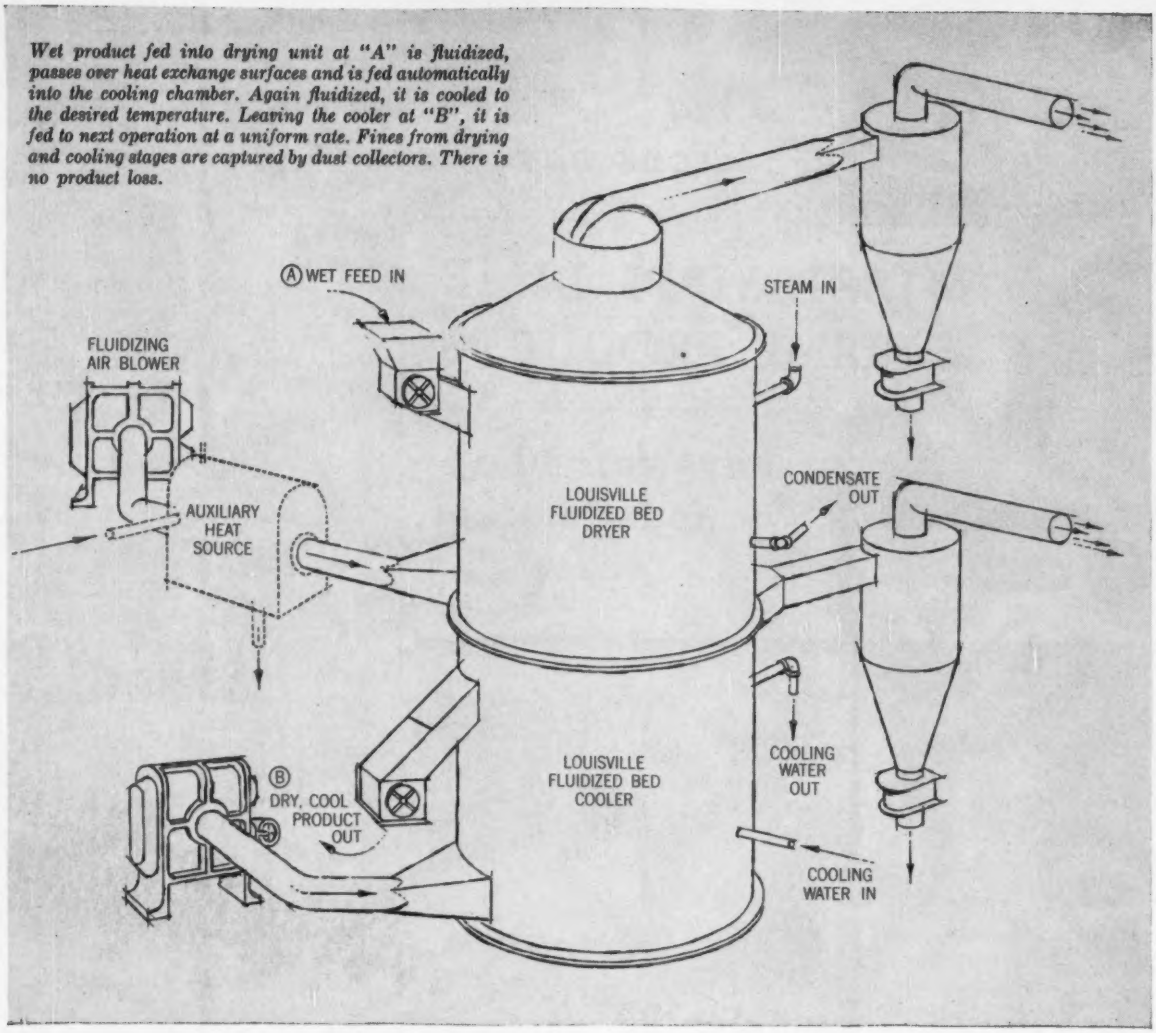
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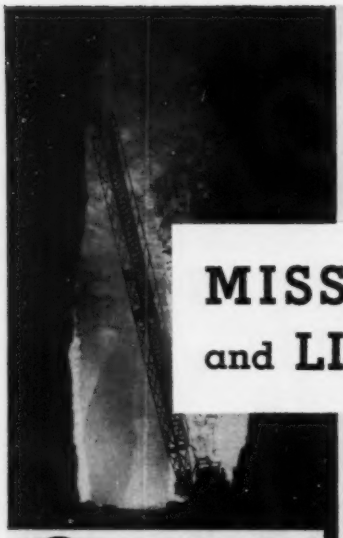

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limits, for unsafe acts and conditions are determined statistically for a 95% confidence level. "This means that once in 20 times the chart may show the area as either in control or out of control when it shouldn't be. But the chart is only a barometer to give warnings, and if we can come that close, we're doing pretty well," says Dave Smith, who supervises safety.

Correlation and Control: The correlation between the control charts and actual plant incidents (either injuries or reported near injuries) is good (*see chart*). The over-all plant control chart, made up by the plant's chemical control group on the basis of weighted averages of the plant areas, shows that three major injuries during a one-year period happened at times when the chart was out of control or moving toward an out-of-control level. However, Hillman Harris, who heads the chemical control group, points out that it's difficult to draw a correlation with major injuries because they seldom occur (only two or three per 10 million man-hours worked at the plant each year).

Not all unsafe acts and conditions wind up as injuries, of course. But they do represent potential injuries, and when an area chart moves toward an out-of-control status, area supervision knows it must tighten up on safety. This might lead to special five-minute shift meetings or area meetings to discuss the inspection results.

Some areas have a "blue ribbon" team of the best safety inspectors recheck the sampled areas immediately if results are suspect. One area uses its blue-ribbon team once every three months as an automatic check on results.

Sometimes, if consistently low potential injury reports are turned in—and verified by checking—the control limits on the chart may even be lowered.

A Delicate Instrument: Regardless of results, the control measures, like the sampling, are carried out by area supervision on a do-it-yourself basis. "The program isn't designed to tell plant management how one area is doing, compared with progress in another. If we create a competitive situation, we create bias. We're using people as meters, and since they are delicate instruments, pressures of any

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Worthington has recently added new pumps at the top and bottom of its Worthite* line.

These new sizes mean you can order standard Worthite centrifugal pumps in capacities up to 4000 gpm and heads up to 275 feet.

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New 8″ Pump—Of different design than the rest of the line, the new 8″ Worthite pump has a twin volute liquid end. A water jacket which serves to either heat or cool the stuffing box area is an integral part of the stuffing box head. The pump can be disassembled from the rear without disturbing the volute, suction head or piping. Separate supports for frame and liquid end facilitate the disassembly.

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Process Trends from DORR-OLIVER

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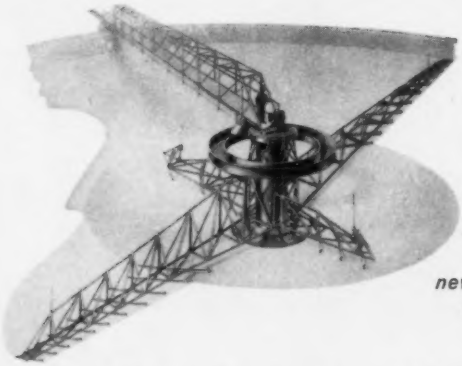

Long-term research program at Dorr-Oliver reveals new potentialities for an age-old technique

The technique of separation by sedimentation is one of the oldest arts of processing. It may be employed to produce a more or less clear liquor from a mixture of solids and liquid (clarification), or to concentrate suspended solids into a denser slurry (thickening). It may also be adapted to give fractional separation of particles of various sizes or specific gravities (hydro-separation).

Modern continuous sedimentation systems, which substitute mechanical means for the old batch methods of slow gravity settling and decanting, date from the invention of the Dorr Thickener in the early 1900's. Although the basic design has remained essentially unchanged, equipment has undergone considerable development. Devices such as multiple compartments and hinged rake arms, flocculation to promote economical handling of colloidal materials, and the combination of several operations within a single tank, have continually expanded scope and versatility.

A long-term project at Dorr-Oliver, aimed at increasing fundamental knowledge, has brought to light many previously unknown principles affecting thickener operation. Relatively simple laboratory tests permit accurate prediction of performance with a wide range of materials. Added to the experience gained in many present fields of application, these developments have resulted in a new understanding of the potentialities of the thickener as a tool for the processing industries.

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kind must be avoided," says Smith.

Pointing Up Problems: The basic problems of the program usually fall into three categories: understanding the sampling technique; understanding the correction procedures; variations between inspectors.

Understanding the sampling technique starts with sample size. Inexperience can result in division of the area into segments that are too large to inspect in 15 minutes. "The inspectors must agree that they are not running a complete plant inspection. If they are still writing down potential injuries at a furious pace at the end of 15 minutes, the area they are inspecting is too large," says Smith.

He adds that it's important to take the same sample size each time, and to run the inspection for exactly 15 minutes each time. Also, the inspectors must understand that they cannot take time out to discuss work problems and projects during inspection.

Moreover, inspection supervisors must understand that correcting the unsafe conditions and acts in the sampled area hasn't corrected them for the unsampled areas.

Offices, Too: Smith points out that the program isn't confined to process areas: "There's no reason why a paper clip on the office floor shouldn't be classified as a potential injury."

About 16% of the plant is inspected each week. "This wasn't planned —it just worked out that way," Smith says. But he believes the plant is covered more thoroughly this way than it could ever be done, on an economical basis, in total plant inspections. The plan does not eliminate total plant inspections, or any other regular safety programs — rather, it complements them. Also, it can be used strictly as a housekeeping program instead of a safety program.

Random sampling won't permit letdowns by inspectors or plant areas after an inspection has been completed. They never know how soon their capsule will be picked again. The only thing that is certain is the inspection time — the plant has found that 9:30 a.m. and 1:30 p.m. are the best inspection times because most of the people are at work then.

On the basis of the Chambers Works' results so far, other plants will soon be giving the program a hard look.

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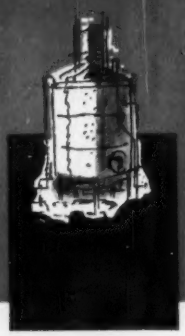

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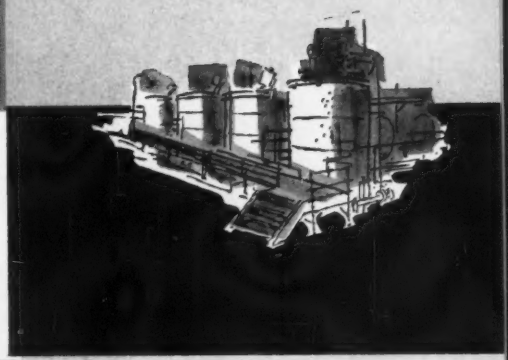

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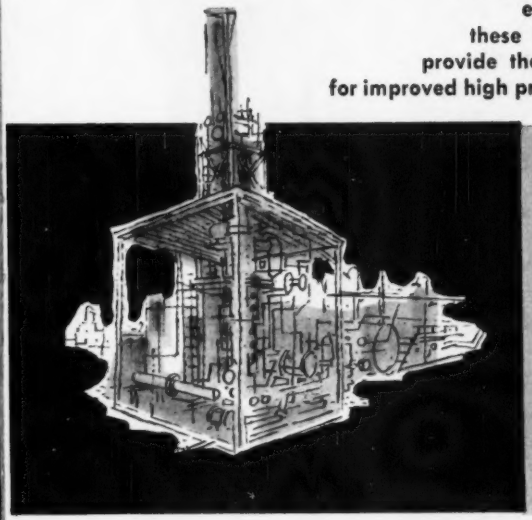

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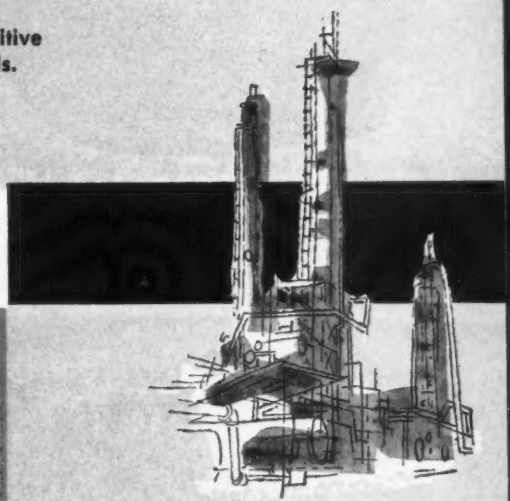

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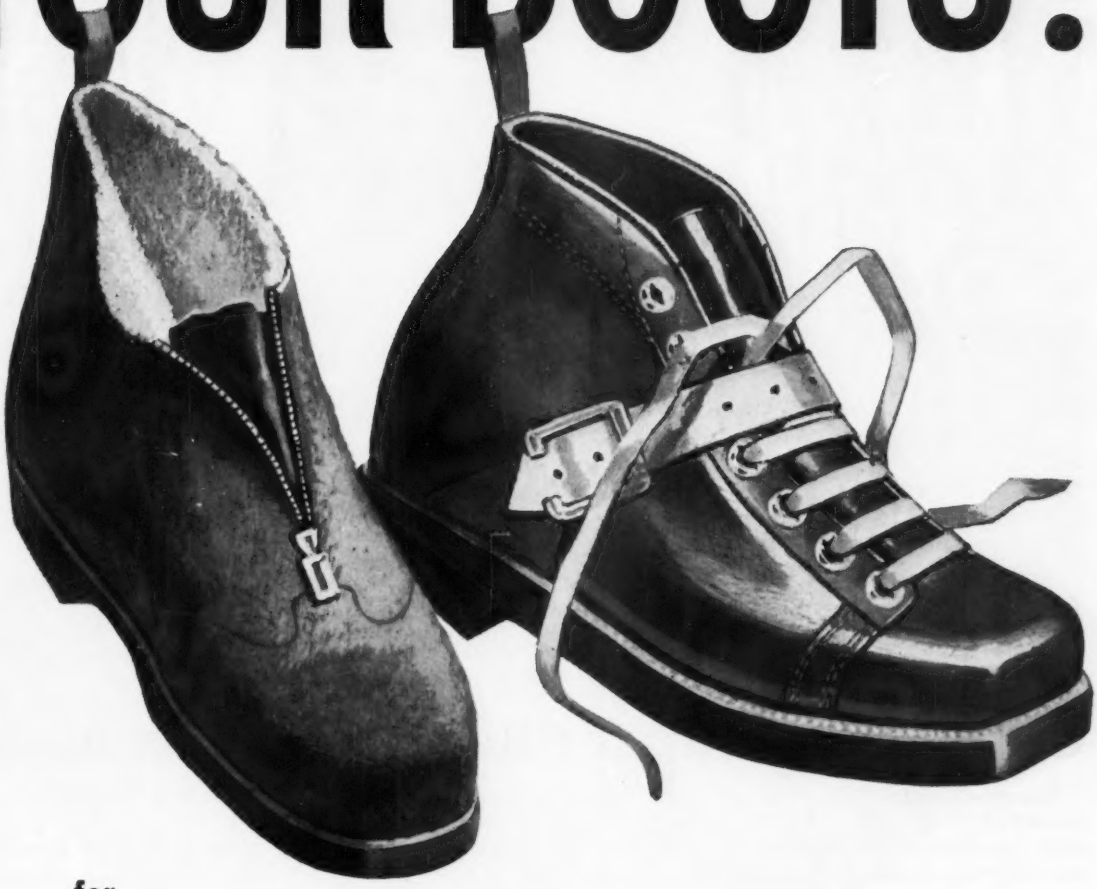

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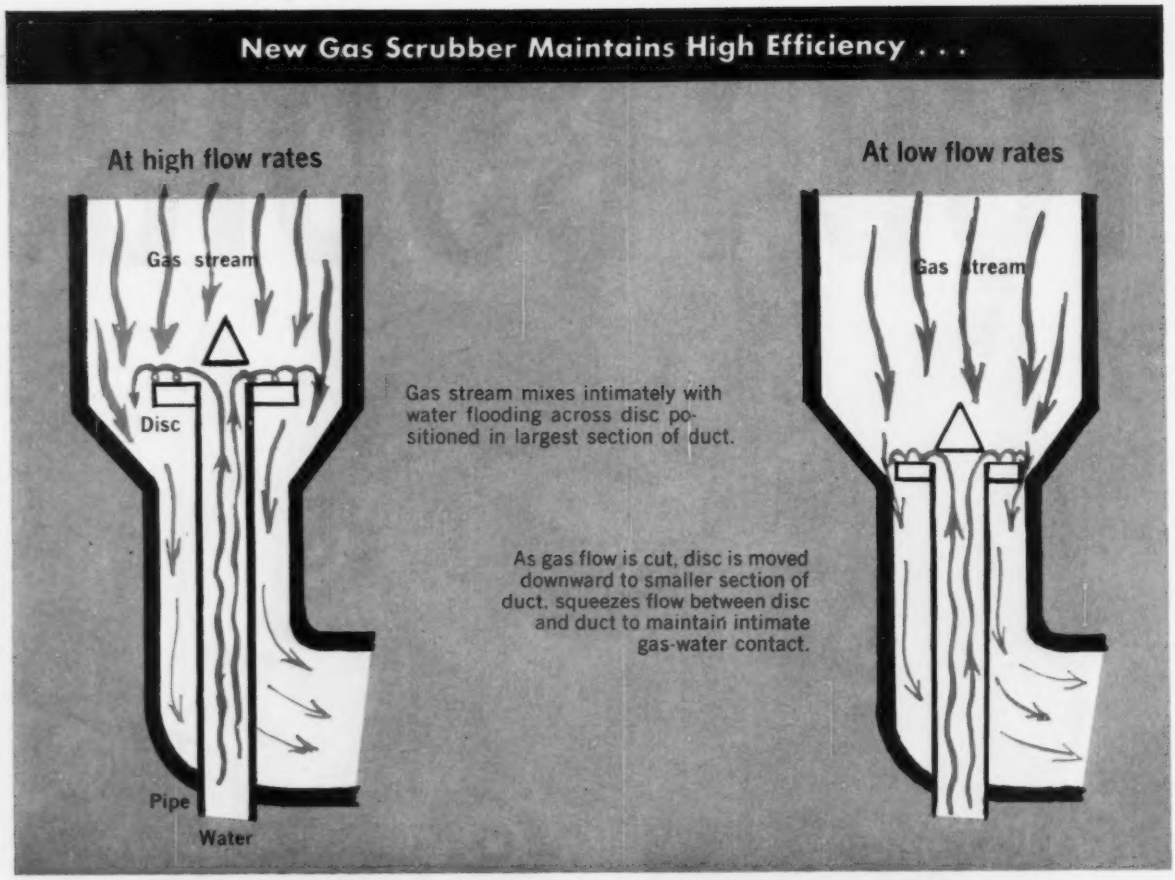
New Gas Scrubber Maintains High Efficiency . . .
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Gas stream
Disc
Pipe
Water
Gas stream mixes intimately with water flooding across disc positioned in largest section of duct.
As gas flow is cut, disc is moved downward to smaller section of duct, squeezes flow between disc and duct to maintain intimate gas-water contact.
At low flow rates
Gas stream

Closing the Gap for Better Gas Cleaning

Research-Cottrell, Inc. (Bound Brook, N.J.), long a maker of electrostatic precipitators and mechanical dust collectors, is setting out to crack the already crowded field of gas scrubbing. Its success depends on industry acceptance of the design principle shown above that permits the scrubber to adjust for wide gas-flow variations to maintain high cleaning efficiency at all times.

The steel industry, which is already testing the scrubber, appears to be R-C's first ripe market because of the many process applications (e.g., in oxygen converting) where there is a wide variation in gas-flow rate during a normal process cycle. But the company also hopes to pick up a good chunk of chemical industry business at the expense of commonly used scrubbers. Its sales point: most ordinary scrubbers require higher water-flow rates to maintain efficiency when gas flow drops off, or they develop excessive pressure drop at high gas-flow rates. And, in either case, energy requirements and operating costs go up.

The new scrubber has a flooded disc (orifice plate) that can be positioned at any point in a tapered section of the gas duct to increase or decrease the annular space between the duct and disc. When the gas flow drops off or increases, the annular space is varied to maintain the pressure drop and scrubbing efficiency of the equipment.

The company expects efficiencies to be maintained above 98%—usually above 99%. Water rates can be maintained at about 5 gpm./1,000 cfm. of gas flow. (And, these conditions can be maintained at gas flows 50% above and below rated capacity.) In blast-furnace gas service, outlet dust concentrations of 0.05 grains/cu.ft. were obtained with 10 in. of water pressure drop, 0.01 grains/cu.ft. with 50 in. of water pressure drop.

Automatic Control: Adjustments of the disc for rapid fluctuations in gas flow can be made with automatic controls developed by R-C to operate on changes in gas flow or system pressure.

Gas scrubbing is achieved by the water, which flows across the disc and is finely atomized by the turbulence of the gas flow. Because the water pipe has no restricting nozzles at its opening on the disc, scrubbing water can be recirculated without danger of pipe plugging by solids.

R-C won't discuss costs, but says they will be "very competitive" with other high-efficiency scrubbers. Scrubbers in the same efficiency range will probably be units such as Chemical Construction's (New York) venturi scrubbers and Ducon's (Mineola, N.Y.) Oriclone (*CW, Feb. 20, p. 104*).

Performance makes the world of difference

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for Atomic Power Plants

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Powell has precision-designed special Valves to handle molten metals and other radioactive materials in atomic power plants—vital and hazardous fluids that must pass through the valves without the slightest leakage or failure.

Painstaking quality control is rigidly enforced in every step of manufacture. Every machine operation is accurately gauged. All parts are thoroughly cleaned and degreased. And every nuclear valve is given an actual line test—plus a snifter or mass spectrometer test.

For complete information, consult your Powell Valve distributor. Or call us direct. We'll be pleased to inform you about Powell Nuclear Valves as well as our complete line of Powell Quality Valves.

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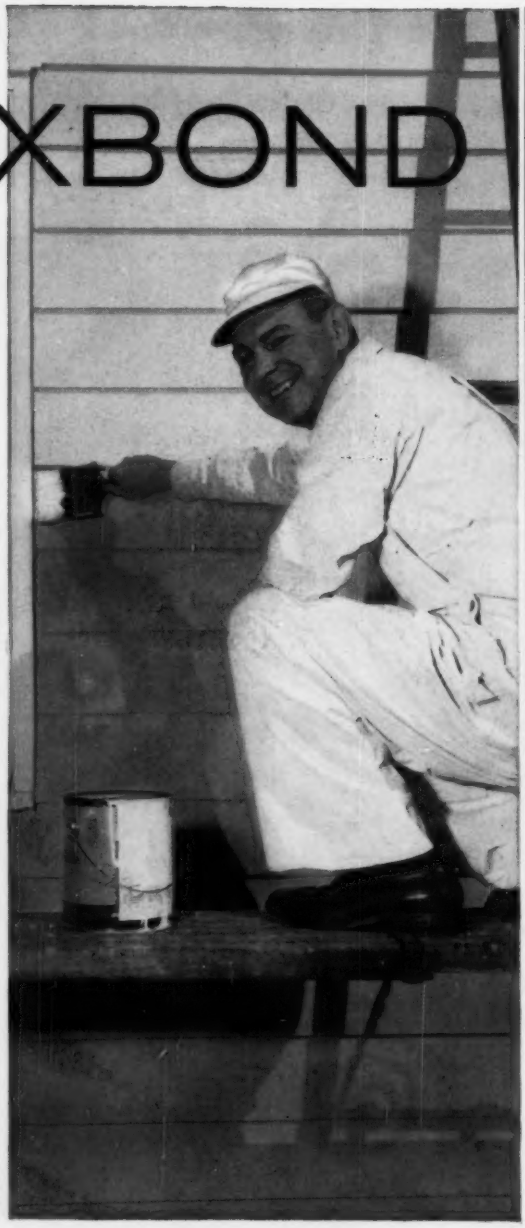
FLEXBOND 800

EXTERIOR LATEX HOUSE PAINTS EXCEL IN EASE OF APPLICATION AND FORMULATION



Exterior latex water-based house paints formulated with Flexbond 800 exhibit qualities approved by customers, dealers and formulators alike. Flexbond 800 paints are truly easy to apply; dry quickly to a soft, flawless finish; are outstanding for whiteness and color brightness.

Paint manufacturers using Flexbond 800 vinyl copolymer emulsions enjoy profit advantages in paints that offer ease of formulation—each resin molecule contains built-in plasticizers and promotes superior color retention.

Flexbond 800 paints start clean, stay clean . . . are free from chalking and staining . . . are blister- and dirt-resistant, non-yellowing. They form a flexible, breathing vinyl film ideal for repainting wood and for all masonry surfaces.

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A Division of Air Reduction Company, Incorporated • 1747 Chester Avenue, Cleveland 14, Ohio
Sales Offices and Warehouse Facilities Throughout U. S. Export: Airco Company International, New York 17, N. Y.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND . . . AN AIR REDUCTION PRODUCT

PRODUCTION EQUIPMENT

Cartridge Demineralizer: Penfield Manufacturing Co., Inc. (19 High School Ave., Meriden, Conn.), offers a new pressure cartridge that yields demineralizer ultrahigh-purity (15 meg-ohms or higher) water at flow rates up to 50 gal./hour. The downflow single-bed deionizer's cartridge unscrews by hand to permit fast resin replacement. Maximum working pressure is 100 psi.; pressure drop is less than 4 psi.; over-all height, 13½ in.; weight, 3 lbs.

•

Pump Pistons: Engineered Ceramics Division of Centralab (900 East Keefe Ave., Milwaukee 1, Wis.) is selling a new line of custom-made pump pistons of high alumina ceramic for use where corrosion and abrasion prevent the use of metal pistons. The ceramic portion of the piston can be manufactured to maximum length of 14 in. and diameters up to 3 in. with tolerances of ±0.0002 in.

•

Electric Vibrator: Vibro-Plus Products, Inc. (Stanhope, N.J.), offers a new compact lightweight vibrator designed for intermittent use on small bins, chutes and hoppers. The EZ-20 vibrator can be plugged into any electric outlet and operated at full rated capacity on single-phase ac. or dc. Frequency range: 0 to 8,000 vibrations/minute.

•

Steel-Reinforced Plastic Tank: A reinforced plastic tank that uses steel cable to carry hoop stresses is a new product of Metal Cladding, Inc., (North Tonawanda, N.Y.). The company claims that tanks as large as any steel tanks can be made. Called the Kabe-O-Rap tank, it is impervious to most corrosive liquids, will not contaminate stored materials and has dimensional stability. Because tanks are molded in segments, which can be carried through a standard door, installation in close quarters is possible.

•

Liquid Depth Temperature: Atkins Technical, Inc., (1276 W. Third St., Cleveland 13) has new, long lead lengths for use with its A+Thermophil electronic thermometers. These instruments permit measurement of the various temperature layers formed when water, liquid chemicals, plas-

Completes 46 Structures in 4 Months

at Petroleum Chemicals, Inc.

CB&I's *coordinated services* played a major role in construction of three new petrochemical plants recently placed on-stream by Petroleum Chemicals, Inc., at Lake Charles, Louisiana.

CB&I's assignment: Fabricate and erect 13 processing towers and 33 storage tanks for an expansion program that would—and did—put three plants in operation during a four-month period.

The new plants—ammonia, ethylene and ethylene oxide-glycol—have catapulted Petroleum Chemicals into a major petrochemicals producer, less than four years after its founding.

Companies on the move, such as Petroleum Chemicals, know they can depend on CB&I's *coordinated services* to meet exacting specifications and schedules. The reason: Expert, *one source* responsibility for engineering, fabrication and erection.

These are the benefits of CB&I's seven decades of *craftsmanship in steel*. Write our nearest office for the bulletin: *Development of the Oil Storage Tank*.

Propane is stored in these vertical blimps built by CB&I for Petroleum Chemicals. Each structure is 60 feet high, 12½ feet in diameter and has a 1,500-barrel storage capacity.

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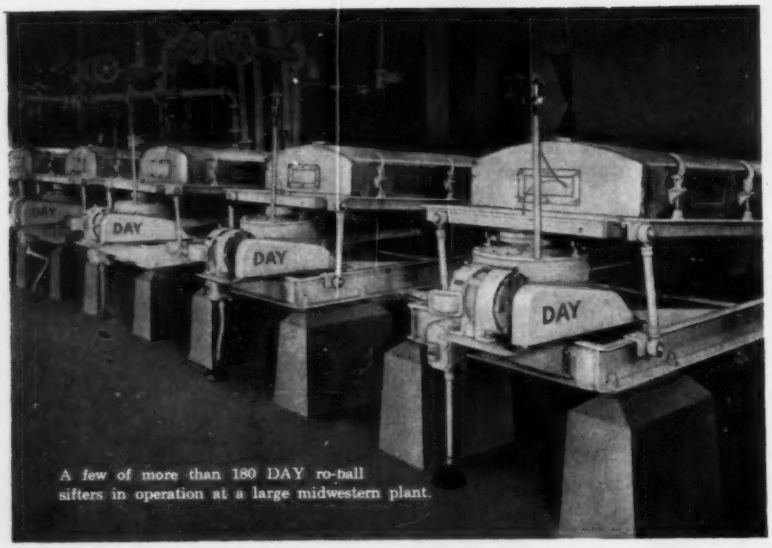
P-83CB

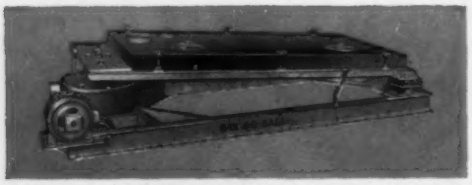
SIFT finer-faster-cleaner with DAY ro-balls

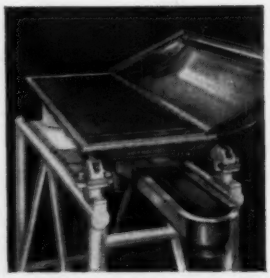


A few of more than 180 DAY ro-ball sifters in operation at a large midwestern plant.

Today thousands of products wet or dry, from flour to wood chips, are sifted through efficient, low-cost, high-production DAY ro-ball sifters. Superbly engineered, built for trouble-free operation under the severest service conditions, they insure longer life with lower maintenance costs.

The exclusive super active ball cleaning device provides rebound points in each ball compartment, assuring fast, thorough sifting of your product. Gyrating action brings material into constant contact with every square inch of screen surface. A stabilizer maintains screen in horizontal position and insures smooth operation.


DAY standard ro-ball, available in six sizes, single or multiple screens. Single screen models in stock.


Stainless steel units available to meet food and dairy sanitary codes.

Many models are available so it is easy to choose one which will exactly suit your requirements. They can be used separately or in combination with DAY mixers or blenders to save product handling. A completely equipped lab is available for testing your product.

Write for new DAY ro-ball Bulletin.

The **J. H. DAY** *Co.*

Division of The Cleveland Automatic Machine Co.

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tics and other fluids stratify. The leads are abrasion resistant, water- and oil-tight. A+temperature range: —148 F to 554 F.

•

Rupture Disc: Fall Industries, Inc. (Solon, O.) offers new impervious rupture discs to prevent vacuum or pressure buildup in tank. Discs are available in burst settings up to 150 psi., are accurate to ±5% of rated burst. They are said to be unchanged by temperature and fatigue, unaffected by most corrosives at temperatures to 650 F.

•

Thread Antiseizing: Felt Products Mfg. Co. (7450 N. McCormick Blvd., Skokie, Ill.) claims its new Fel-Pro C5A antiseize thread compound of colloidal copper can be used to lubricate and seal bolts, studs and flanges for operating temperatures to 1800 F.

•

Adsorption Measurements: Perkin-Elmer Corp. (Norwalk, Conn.) is offering a new Model 212 Sorptometer for fast measurements of surface area of materials such as cracking catalyst, cosmetics, pigments, clays, fertilizers and abrasives. The unit eliminates the need for fragile glassware and vacuum equipment. Analyses can be completed in 10 minutes without skilled operators, P-E says. Shell Development Co. worked out the unit, gave P-E an exclusive manufacturing license.

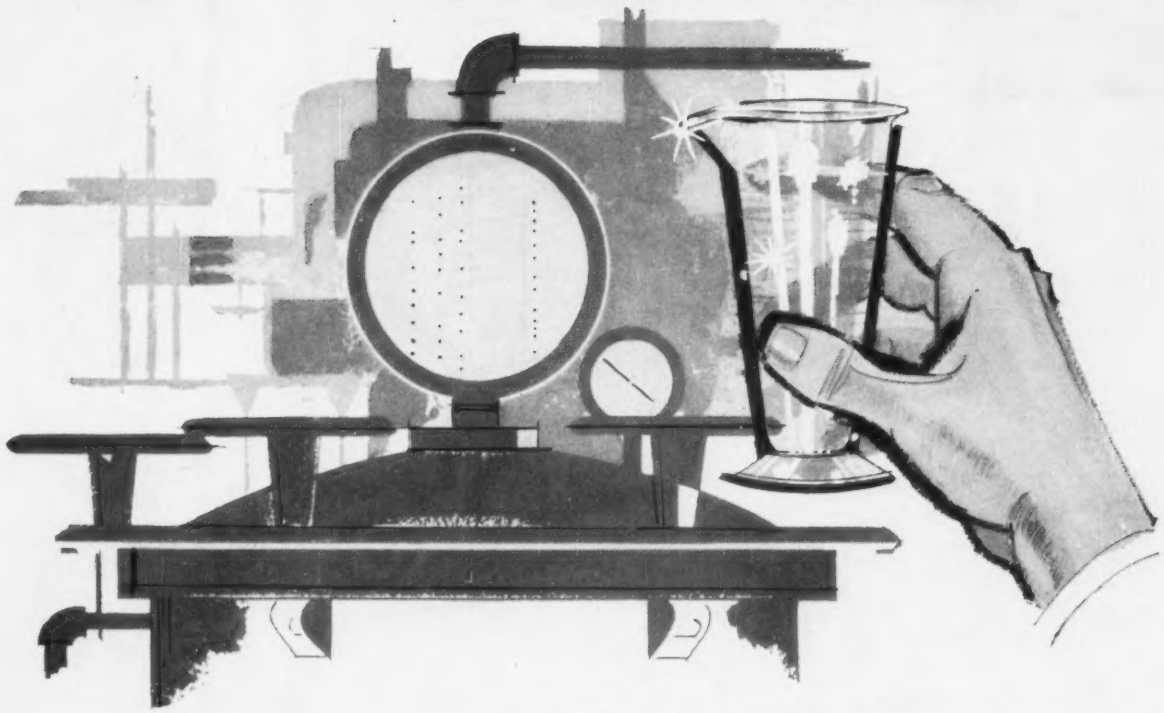
•

Elapsed-Time Controller: Weston Instruments Division of Daystrom, Inc. (614 Frelinghuysen Ave., Newark 12, N.J.) is offering a new, elapsed time controller for automatic, timed regulation of pressure and temperature in batch-type operations. Timer's control signal is pneumatic. When preset time has elapsed, controller shuts down, timer resets for repeat cycle. Time ranges: 1, 5, 12 and 24 hours; minimum setting: 4% of range. Operating temperature ranges: —100 to 1,000 F; pressure ranges: 30 in. of Hg vacuum to 7,500 psi.

•

Bleaching Unit: Dorr-Oliver Inc.'s (Stamford, Conn.) new concentric tower for high-density pulp bleaching combines upflow mixing of chlorine dioxide and pulp under hydrostatic pressure, and downflow dilution and neutralization, in a single, compact unit that eliminates the mounting of equipment above the bleach tower.

New Standards of Filtration Control



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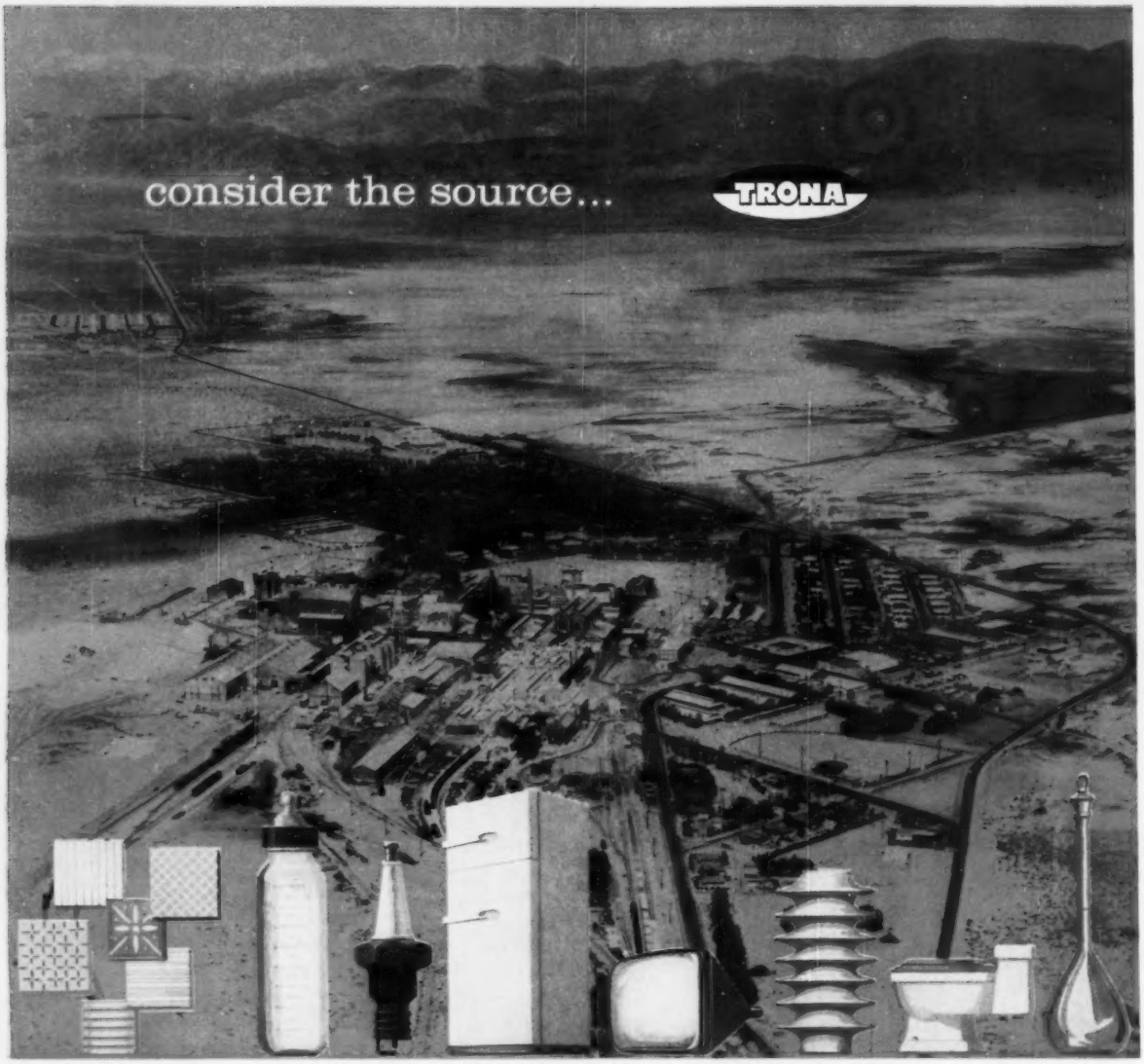

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'Quick-breaking' foam is dispensed in limited area, disappears rapidly when rubbed into skin.

Latest Aerosol Pitch: Touch-and-Go Foam

The newest wrinkle in aerosol foams was on display last week at the National Packaging Show in Atlantic City, N.J.: a newly developed "quick-breaking" foam by Allied Chemical's General Chemical Division (New York). The development could lead to a host of new pushbutton products in the fast-growing, 550-million-units/year aerosol market.

General's foam is described as quick breaking because, when applied to the palm of the hand, body warmth causes it to quickly break into a liquid. This feature is expected to prove valuable in a variety of products in the cosmetics and toiletries field.

For example, in one experimental product developed by General—a nail polish remover—a small drop of foam is applied to the fingernail. When the foam comes in contact with cotton, it becomes a liquid, easily removes the polish.

Eight Products: General's Aerosol Technical Service Laboratory has come up with eight suggested applications for its fast-breaking foam. In addition to the nail polish remover, it has tested after-shave lotion, hair dressing, sun tan lotion, cologne, toilet water, cold-wave lotion and insect repellent.

Some of these items are now packaged in conventional liquid- or mist-type aerosols. The cost of a quick-breaking foam product, however, is said to be less than that of a regular foam or spray aerosol.

Foam Formulas: The basic formulation for the new foam contains ethyl alcohol, a surfactant, water and propellant. The amount of surfactant in fast-breaking foam is said to be much less than is required in formulations for regular foam products like aerosol shave cream.

Result of a Request: The work on the foam was an outgrowth of a request two years ago for a foam hair tint, and recently for an after-shave foam. General learned the consistency and stability of an aerosol foam could be altered by varying three elements: ratio of the solvent; percent, or type, of surfactant; type and pressure of the propellant. The company has worked out formulations altering all three.

A typical formulation—this one for the after-shave lotion: Polawax, SDA No. 40 (anhydrous), menthol, camphor, perfume, Emcol E-607, allantoin, distilled water and Genetron propellant. The percentage of concentrate is 92%, propellant 8%.

While the surfactant in the formulation can be nonionic, anionic or cationic, it must be soluble in either alcohol or water, but not in both. The filling process is done while the concentrate is warm.

Marketers Interested: Commercial development of these products still lies ahead, with one exception. Procter & Gamble has been test marketing an aerosol home permanent, Pushbutton Lilt, in which the cold-wave lotion is a foam type (*CW, Feb. 27, p. 48*). P&G, however, developed its product independently.

A number of cosmetics companies are now looking closely at the foam—it is likely that products will appear on the market shortly.

Ortho-Anisaldehyde

Sorry . . . but we can't presently give you much use information on O-Anisaldehyde. From what we've determined, however, this material (you may also know it as O-Methoxy Benzaldehyde) is expected to find uses as a pharmaceutical intermediate and in organic synthesis. We can supply you with our latest technical bulletins and samples. And we'd like to help you investigate any possibilities that the physical properties might suggest to you. Write us.

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Property Data*	
Molecular weight	136.14
Boiling point (at 760 mm. Hg.)	238°C.
Melting points**	(1) 38-39°C.
	(2) 3°C.
Specific gravity (liquid) 25°/25°	1.1274
Specific gravity (solid) 25°/25°	1.258
Refractive index n 20°D	1.5608
Odor—burned, slightly phenolic	
Solubility in H_2O—slightly soluble	
Minimum purity	95%
Appearance	white to light tan solid

*Determinations made on 99% pure material
**Exists in two crystalline forms

ANSUL CHEMICAL COMPANY • MARINETTE, WISCONSIN

Pylam's President Reynolds maps new ventures in dye field.

Pylam Hoists Its Colors

Last week Pylam Products Inc. disclosed that it's moving from Greenwich Village (New York) to a new plant site near New York's Idlewild International Airport. For the 43-year-old dye supply company, the move is more than a simple change of address: it's part of an ambitious plan, mapped out by a hustling young president, to make the little-known firm a bigger factor in the dye field.

Since the new president—33-year-old Ralph Reynolds—took over the corporate reins last fall, he has put several new ventures into motion. In new products, for example, the firm has been busy. It has introduced an improved line of colors for plastic and petroleum use, expanded its line of data-processing color-coding colors, brought out a new line of colors for hair tinting and dyeing, and developed a permanent dye (green for ordinary use, pink for tea parties) for use on lawns.

In addition, the company is going after an increased share of the certified food and drug color business. Although Pylam was the second company in the U.S. (H. Kohnstamm & Co. was first) to gain Food & Drug Administration approval for use of its colors, the firm has never actively pushed these products.

Sales will be strengthened by new distribution setups in Chicago, Los Angeles and Dallas. Also, salesmen will be hired to actively sell Pylam products. In the past, practically all selling was done through direct mail; few customers ever saw a Pylam representative.

Also slated for change is the company's packaging and promotional methods. Although Pylam is in the dye business, it seldom has made use of colors in its own mailings and packages. Now the firm plans to use more color to sell its colors.

Small but Necessary: Reynolds feels that a company such as Pylam can find a bigger niche for itself in the dye business by catering to the needs of small-volume users—e.g., small cosmetics makers, private-label detergent producers. The key to success, according to Reynolds, is to provide extensive technical service to small-volume (under 250-lbs.) customers. Right now, the large dye houses handle many such customers, but find it unprofitable. Reynolds feels that a company like Pylam could take over these small accounts without jeopardizing any existing relationships.

In fact, there could be a two-way street, says Reynolds. The smaller dye firms could, in turn, channel larger dye orders to the larger companies, as well as buy dyes from the large firms to make up special dye products, he adds. (Reynolds' company

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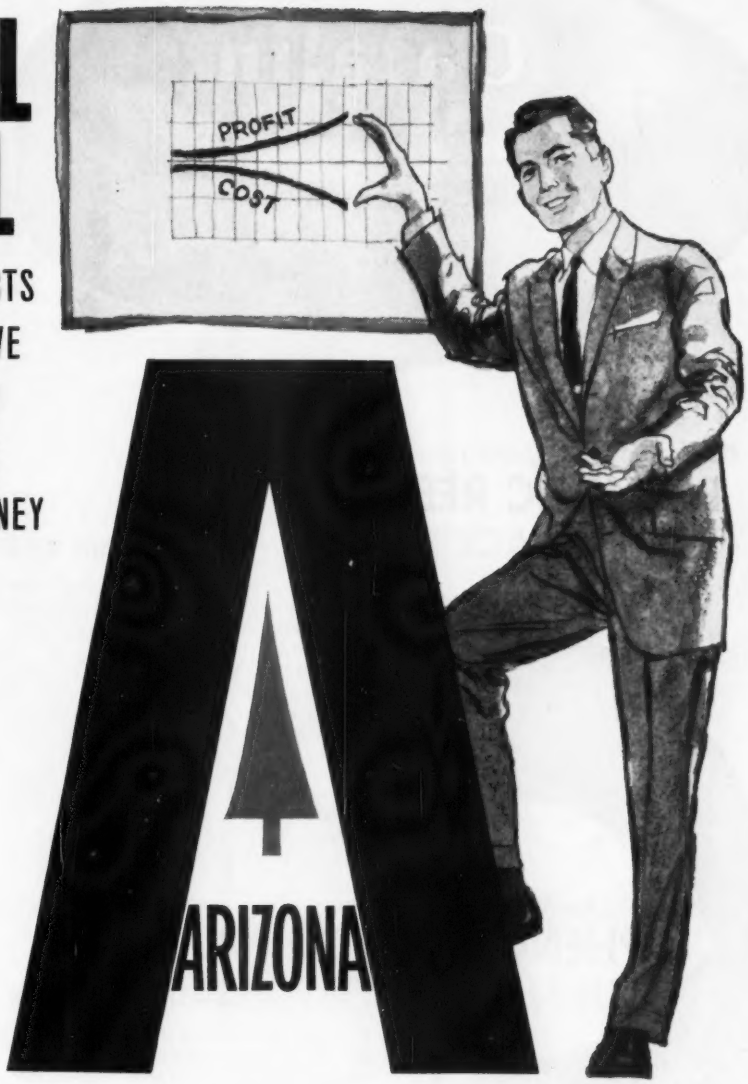

Arizona tall oil products never vary...are constantly high in quality. This strict insistence on uniformity saves you time and money in your manufacturing operations. Eliminates adjustment of formulations, keeps your processes constant, the quality of your product consistent. Next time you need tall oil products, do what so many industrial leaders do: contact Arizona.

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A proven, non-heat reactive, oil soluble phenolic resin tackifier . . . highly compatible with SBR, Acrylonitrile, Butyl, Neoprene and natural rubber.

Catalin Resin 8318 is supplied in an easily used, crushed form and is highly soluble in common solvents such as aromatic hydrocarbons, ketones and drying oils. It can be milled with the rubber stock used in the production of tires and mechanical goods . . . or mixed with solvents and rubber for the production of pressure-sensitive cements.

This resin is also available in emulsified form and is designated Catalin Resin 9775

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Catalin Resin 9273 can be readily milled with the rubber stock or in the compounding of adhesives, mixed with the solvent and premilled rubber. It is soluble in common solvents such as toluene and xylene.

Catalin Resin 9273 is particularly useful in the production of steam hose, curing bags and bladders, belting for conveyors, tires, gaskets, grommets, cements.

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In addition to rubber curatives and tackifiers, Catalin also produces one and two-stage phenolic and cresylic resin reinforcing agents, modified resins and antioxidants.

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currently has such a setup with American Cyanamid.)

Other Irons in Fire: Besides getting a new plant for Pylam Products, Reynolds is working with a group of technicians and investors on a multi-million-dollar venture scheduled to be set up in New Jersey. It's planned as a completely separate operation, is slated to produce dyes that have a larger-volume use than the type of product Pylam makes but not enough volume to interest the large dye houses. Primary targets for these products will be the plastic and petroleum fields. This project, reckons Reynolds, is about a year away.

Looking Back: Pylam's changeover began last September, when Reynolds, an executive vice-president of Acoustica Associates (an electronics outfit), left that company and bought complete control of Pylam from the widow of the founder, Colonel Samuel Cummings. She had been heading the company since the colonel's death (four years ago) but was not enthusiastic about the role. The sale to Reynolds—a close family friend—was the result of a casual conversation between the two.

For now, Reynolds main interest will will be in sparking Pylam's operations. With the new plant, he figures to push sales from $250,000 today to $1 million in about three years.

Beyond that, he's not sure what course the company should take. He feels that at the $1-million mark the company wouldn't be able to function as it does now—as a supplier of specialized products to small-volume users of dyes. Right now, he will concentrate on putting more black in Pylam's color sales.

New Tack in Fungicides

A new approach to controlling bacteria and fungi in the textile, paper and medical fields is covered in a recently issued patent, U. S. 2,931,753.

Unlike most conventional fungi-control techniques, which employ soluble forms of quaternary compounds, the new method's antimicrobial compounds are extremely insoluble in water, oil and all common organic solvents.

The new compounds comprise a broad class of long-chain, quaternary ammonium salts of polysaccharide carboxylic acids, as well as long-chain,

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For complete information see Chemical Materials Catalog, pages 212-213.

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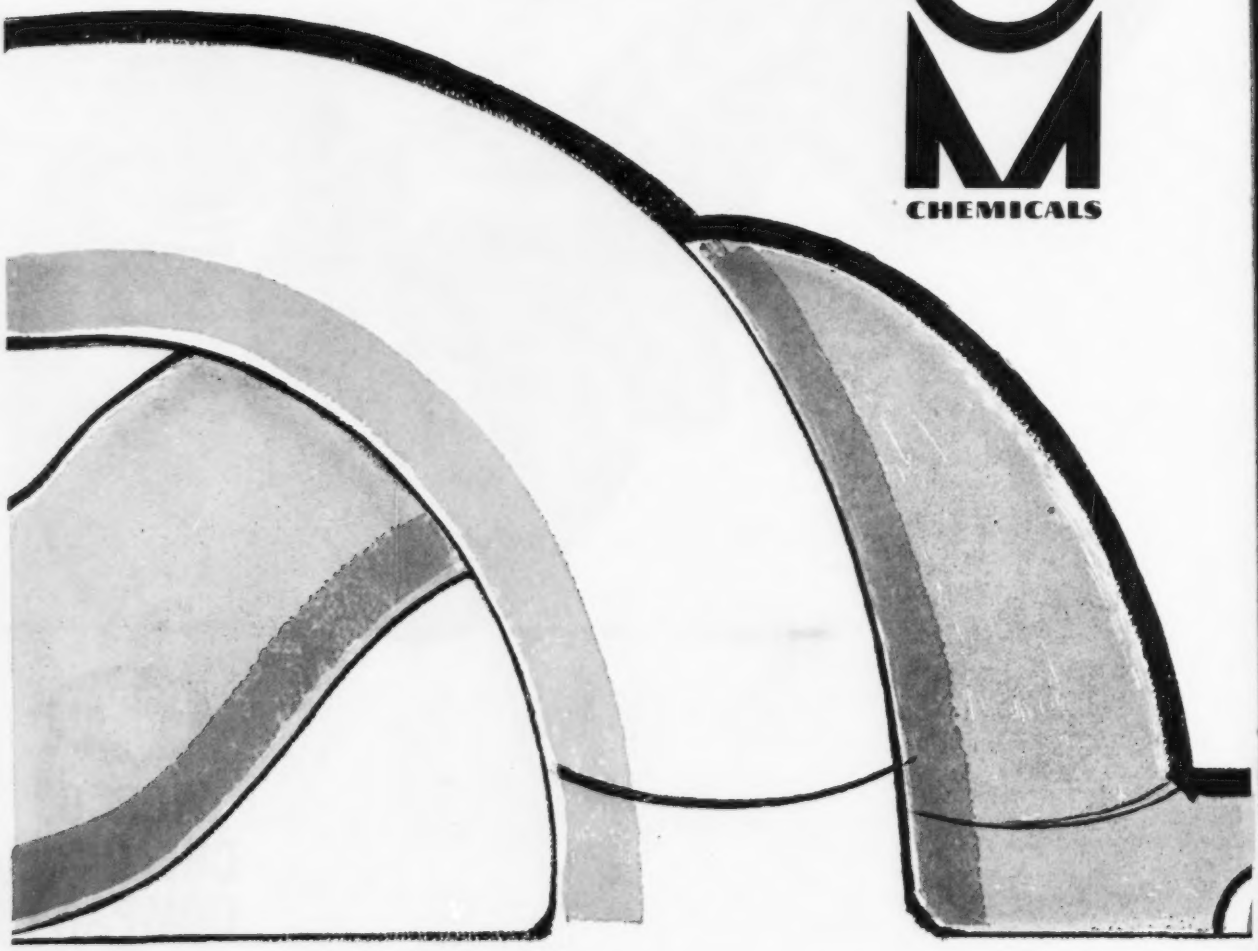
CHEMICALS DIVISION, BALTIMORE 3, MD.

CHEMICALS



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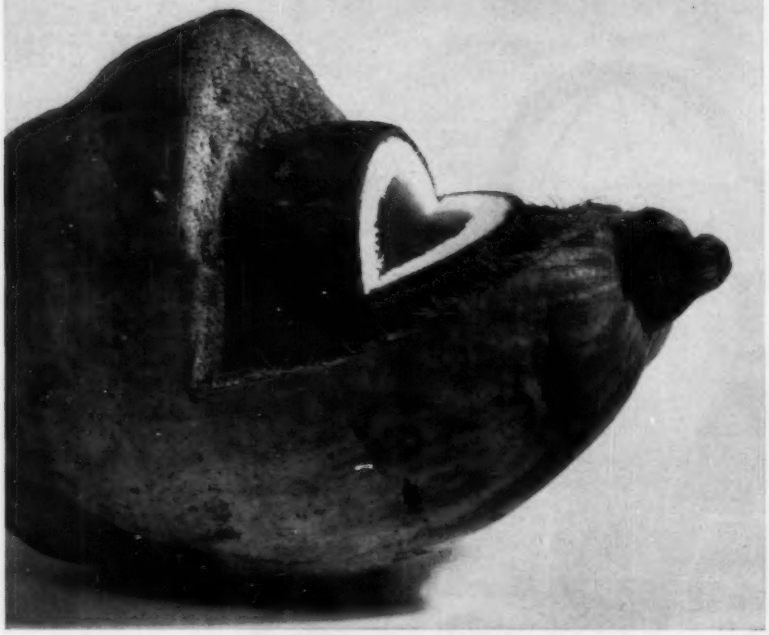
USE COCONUT OIL FATTY ACIDS OR METHYL ESTERS?



Foremost-El Dorado's non-secret ingredient . . . is EXPERIENCE

When you specify Foremost-El Dorado fatty acids or methyl esters, you're buying products from people who are specialists in the field. For over 65 years, Foremost-El Dorado has been producing the highest quality coconut oil products available.

PURITY You can be sure of highest purity on the market.
UNIFORMITY The exact specification on every shipment.
SERVICE On-time delivery. Foremost-El Dorado ships to your requirements. In drums, bags or tank cars. Also mixed compartment tank cars of acids and esters.

Let our representatives work with you. For the Foremost-El Dorado Agent in your area, write or phone Department C-260.

COCONUT OIL

FATTY ACIDS		METHYL ESTERS	
Caprylic	*Palmitic*	*Caproate*	*Palmitate*
Capric	*Cocoleic*	*Caprylate*	*Oleate*
Lauric	*Eldhyco**	*Caprate*	*Eldo* 18*
Myristic	*Coconut*	*Laurate*	*Coconate*
		Myristate	

**T. M. Reg.*

Foremost EL DORADO

FOREMOST FOOD AND CHEMICAL COMPANY

P. O. Box 599, Oakland 4, California

antimicrobial amine salts of such acids. The anions include such acids as carboxy alkyl celluloses (e.g., carboxy methyl cellulose), alginic acid and pectic acid.

In spite of their extreme insolubility, these compounds have been found to show high antimicrobial effectiveness when in a colloidally dispersed condition. They're said to have phenol coefficients of the same magnitude as equivalent concentrations of soluble quaternaries.

Promoting the Product: Commercial promotion of the patent is being handled by Coastal Chemical Development (Berkeley, Calif.). The group estimated cost of applying the compounds in the range of 1-1.5¢/lb. of material treated.

Uses seen for the new compounds include mildewproofing of cellulose fabrics and paper, fungistatic treatment of cardboard and fiber board, preservation of cellulosic felts, antirotting protection for cordage, rope, fish nets, and canvas.

Pharmaceutical uses might include bacteriostatic ointments, dentifrices, and dusting powders. In the medical field, it's thought that bacteriostatic surgical gauze and disposable paper tissues can utilize the compounds. Also being looked at: "self-sanitizing materials" (which require no steam sterilization) such as hospital bedding.

Process Procedure: The insoluble compounds are prepared by the reaction of a water-soluble, long-chain quaternary or amine salt (usually the chloride) with a sodium salt of carboxy methyl cellulose or other polysaccharide carboxylic acid.

A wide range of cationic reactants is available, from the well known commercial quaternaries to certain antimicrobial amine salts. For anions, the synthetic cellulose carboxylates and natural products (such as alginic and pectic acids) are available.

Two principal methods of application of the insoluble quats are reported. In one, the precipitated product, either in slurry or filter cake form, may be converted into a colloidal dispersion, which is applied to the material being treated. The other, a two-step method, involves formation of the insoluble quaternary *in situ* on the fabric or paper by first running the material through a bath containing the soluble cationic reactant, followed by treatment in a second bath

CIGARETTE FIRE DESTROYS BUS
Loss Set At $7,500 In Hackensack Blaze
Hackensack — An Inter-City bus parked at the company's Passaic Street terminal was destroyed last night in a raging fire caused by a lighted cigarette left on a seat of the vehicle.
A spokesman for the company said the $7,500 bus was a total loss.
Engine Company 5 of the Fairmount Station responded to an 8:24 P. M. call, and had the fire under control in 20 minutes. Dep-

Photo courtesy Bergen Evening Record, Hackensack, N. J.

Add flame-resistance to your plastics with CELANESE PHOSPHATE PLASTICIZERS

Celanese plasticizers do much more than impart fire-resistant characteristics:—they provide rapid solvation with most resins, assure permanence, are resistant to extraction by oils and water. Celanese gives you four different grades of tricresyl phosphate: low color, low specific gravity, general purpose, and electrical grades. Celanese chlorinated phosphate plasticizers are outstanding for flame retardance. They are often used as additives in thermosetting plastics for their fire-retardant properties alone. For information on Celanese phosphate plasticizers, write to: Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 652-D, 180 Madison Ave., N. Y. 16. Celanese® Lindol® Celluflex® Cellulphos®

- **LINDOL:** Tricresyl phosphate. Low color.
- **CELLUFLEX 179A:** Tricresyl phosphate. Low specific gravity.
- **CELLUFLEX 179C:** Tricresyl phosphate. General purpose.
- **CELLUFLEX 179EG:** Tricresyl phosphate. Electrical grade.
- **CELLUFLEX 112:** Cresyl diphenyl phosphate. Improved low temperature performance.
- **CELLUFLEX TPP:** Triphenyl phosphate. For cellulose acetate.
- **CELLUPHOS 4:** Tributyl phosphate. For nitrile elastomers.
- **CELLUFLEX CEF:** Tris (beta-chloroethyl) phosphate. Exceptional flame resistance. Chlorinated.
- **CELLUFLEX FR-2:** Tris (dichloropropyl) phosphate. Exceptional flame resistance. High chlorine content.

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

Celanese CHEMICALS

SPECIAL MESSAGE FOR COLOR CHEMISTS...

ABOUT

THE IMPORTANCE OF

PIGMENT PARTICLE SIZE

to the proper pigmentation of your products . . .

!

Color, tinting strength, hiding power, oil absorption, dispersability, ease of grinding, suspension, freedom from abrasion, reactivity . . . these and other essential properties of pigments and extenders are directly related to pigment particle size.

In Williams' *synthetic* pigments—kroma reds; pure red, yellow, black and brown iron oxides; chromium oxides; and albacar calcium carbonates—particle size is carefully controlled at time of manufacture. Oversize is eliminated. Each of these types is available in a broad range of particle sizes.

With *natural* pigments, Williams produces specially sized materials, including VVF red oxides, metallic browns, siennas, umbers, and sparmite (super fine Barytes). Here again oversize is eliminated.

Below are the ranges of particle size distribution available for Pure Red Iron Oxides and Barytes. Other pigment groups have similar distribution ranges. For complete technical data, write Dept. 39, C. K. Williams & Co., 640 N. 13th St., Easton, Penna.

% BY WT. BELOW INDICATES SIZE

Micron Diameter	Pure Red Oxide		Barytes	
	Light	Dark	Sparmite	No. 1 Barytes
40	100	100	100	99.8
30	100	100	100	99.0
20	100	100	100	88.5
15	100	100	100	73.0
10	99.9	99.3	97.5	57.0
7.5	99.2	98.3	87.0	47.5
5	98.2	84.9	66.5	36.0
4	97.7	74.5	55.0	30.0
3	97.2	25.2	43.0	24.0
2	96.2	7.3	29.5	17.5
1	90.6	5.6	15.0	10.5
0.5	78.0	4.9	7.0	5.0

WILLIAMS
COLORS & PIGMENTS

"Pigment Technology at its best"

C. K. WILLIAMS & CO. / EAST ST. LOUIS, ILL. / EASTON, PA. / EMERYVILLE, CAL.

with the anionic reactant. Since long-chain quaternary ammonium and amine salts are substantive to cellulose, the first reactant is adsorbed in the microscopic pores of the fibers. When reaction occurs with the second reactant, the extremely insoluble polysaccharide carboxylate product is firmly fixed within the fibers, and its colloidal nature produces the effective antimicrobial action.

The products may also be made in the form of finely divided powders, for which the alginate and pectate anions are thought to be more suitable than cellulose carboxylates.

EXPANSION

Detergent Tower: The Los Angeles Soap Co. (Los Angeles) has dedicated a new $1-million powdered detergents plant, including a 110-ft. spray tower.

•

Buy Philly Firm: Chemical Concentrates (Fort Washington, Pa.) has added to its lines of waxes and cleaning and sanitizing compounds with the purchase of Veneer-O-Wax Corp. (Philadelphia), specialty maker in these fields.

•

Ground Breaking: Avery Label (Monrovia, Calif.), producers of pressure-sensitive labels, broke ground for an 18,000-sq.ft. plant in Cleveland.

•

Paint Equipment: Kaiser Aluminum & Chemical Corp. (Oakland, Calif.) has completed facilities for producing painted aluminum coil at its Richmond, W. Va., rolling mill. Automatic equipment coats widths up to 66 in.

•

Southern Plant: Canco Division of American Can Co. (New York) has opened its new, 150,000-sq.ft. plant in Atlanta. Four production lines are in operation.

•

Distributors Added: Union Carbide Plastics Co. (New York) has appointed three new distributors for its protective and decorative coatings materials: Cary Co. (Chicago), Van Horn, Metz & Co. (Conshohocken, Pa.), and A. C. Mueller Co. (Cleveland).

•

Cloth Maker Acquired: Speedry Chemical Products, Inc. (Richmond Hill, L.I.) has acquired Manard Chemical Co. (New Rochelle, N.Y.), manufacturer of chemically impreg-

100- or 150-lb. cylinders with I. C. C. approved valves or one-ton containers in 6, 8 or 10-ton lots on special trucks.

by truck

100- or 150-lb. cylinders; one-ton containers in 15-ton multi-unit tank cars; single-unit tank cars.

by rail

get liquid chlorine your way

It's the handling and shipping and technical skills that make the big difference in *liquid chlorine.* Diamond is not only one of the largest producers, but delivers chlorine the way that makes you glad you said, "Diamond." Where you want it . . . when you want it . . . as you want it.

Barges with capacity of 600 tons, on America's principal inland waterways, bring big users lowest possible shipping costs.

by waterway*

*From plants at Muscle Shoals and Houston

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Diamond Chemicals

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Pennsylvania Electric Co.
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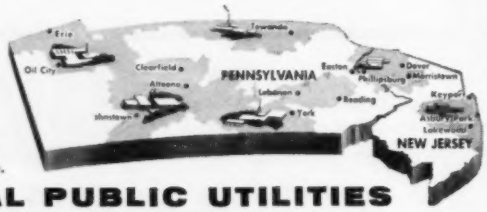


GENERAL PUBLIC UTILITIES CORPORATION

Att: Wm. J. Jamieson, Area Development Director, Dept. CW-4
67 Broad St., New York 4, N. Y. WHitehall 3-5600

SPECIALTIES

nated cloths tradenamed Chem-Wipe Cloths. The new division will be operated as a wholly owned subsidiary. Production will be moved to Speedry's Jamaica, L.I., plant.

•

New Company: Holl-Chem, Inc. (Seattle), has been formed by Paul J. Holloway, formerly vice-president of Tricon Chemicals (San Francisco). The new company will make degreasers, tank cleaners, and descalers.

•

Turco Licensees: The Chem-Mill Division of Turco Products, Inc. (Wilmington, Calif.), has licensed United Aircraft Corp. and Aerojet-General Corp. to use Chem-Mill's chemical milling process.

•

Can Coatings: Du Pont (Wilmington, Del.) will build facilities for production of Budium polybutadiene interior coatings for food and beverage cans at its Fort Madison, Ia., plant. Production is scheduled for mid-'61.

LITERATURE

Cosmetic Formulary: Formulas for 21 cosmetic products, including cleansing, hand, hair, night and hormone creams, are available in an eight-page folder. Morningstar-Paisley, Inc. (630 West 51st St., New York).

•

Paint Explanation: A 12-page illustrated bulletin, Paint Your Way to Fire Safety, describes how fire-retardant paints work and how they are applied in industrial, commercial and institutional buildings to reduce fire hazard. Albi Manufacturing Co. (Rockville, Conn.).

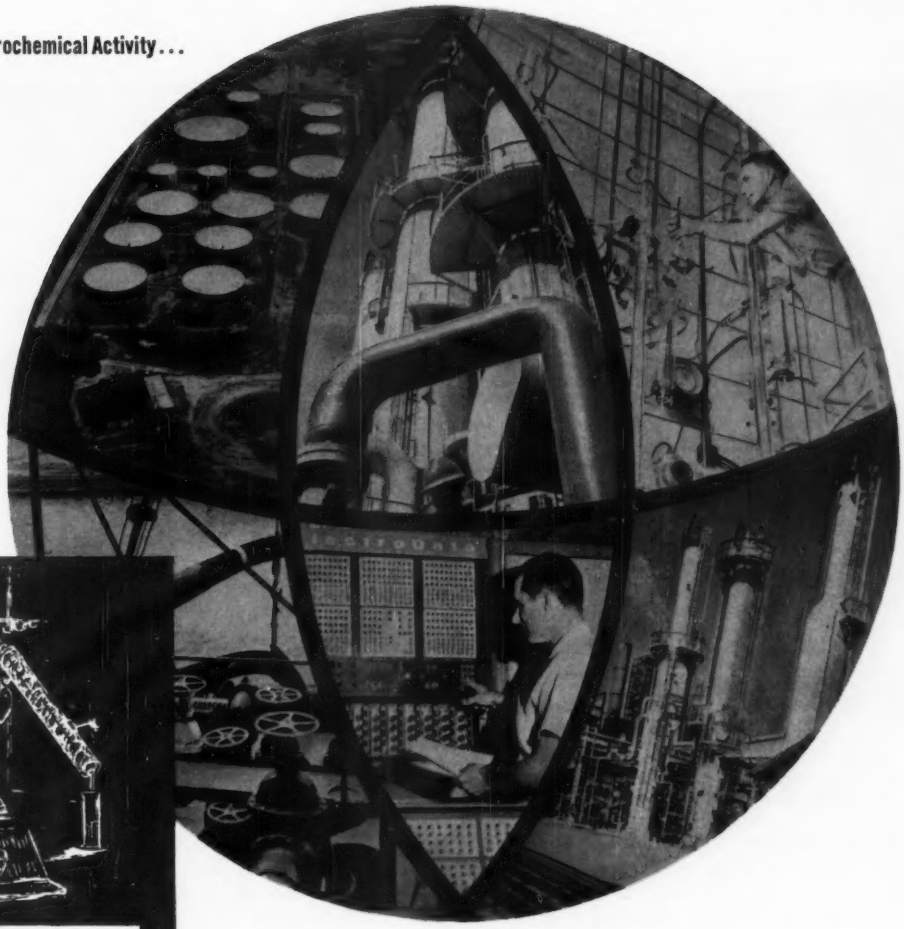
•

Surfactant Trio: A new brochure, No. TA-60, from Antara Chemicals describes use of its three surfactants, Igepon T, Igepal CO-730, and Igepal DJ-970, in conjunction with caustic soda for bottle-washing formulations. General Aniline & Film Corp. (435 Hudson St., New York).

•

Wax Review: A technical paper reviewing petroleum waxes describes structure, production, refining and analytical and functional properties. Special emphasis is on microcrystalline wax. Sonneborn Chemical and Refining Corp. (300 Park Ave. South, New York).

from the Delhi Sphere of Petrochemical Activity...



TYPICAL ANALYSIS

Sp. Gr.	.8708
Gravity, °API	31.0
Weight, Lbs/Gal	7.251
Color	30+ Saybolt
Distillation	Range 0.8°C
Paraffins	.04%
Acid Wash Color	Less than No. 1 Standard
K. B., Toluene	105
Flash TCC	46°F
Mixed Aniline Point	50°F
Acidity	No free acid
Sulfur	No H_2S or SO_2 or Thiophene

DELHI TOLUENE

...low in paraffin...high in purity

The properties of Delhi-Taylor Nitration Grade Toluene speak for themselves. We welcome comparison of its exceptionally low paraffin content, high Kauri-Butanol value and freedom from sulfur and thiophene.

As a solvent or as a chemical building block, Delhi Nitration Grade Toluene offers the advantages of precision processing and rigid quality control standards, backed by Delhi's dependable service.

Bulk deliveries of Delhi Toluene are efficiently handled from our plants and strategically located bulk terminals.

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CHEMICAL DIVISION

DELHI-TAYLOR OIL CORPORATION

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MHI's Tech Service/Custom Reaction Team Can Link Your Ideas to a Process Reality

It's happening every day! Processors — like yourself — who suspect that hydrides might solve a problem or boost process efficiency call on MHI. With unparalleled experience in the field of hydride chemistry, MHI technical service engineers can give you fast and accurate answers based on the most up-to-date information. If this initial evaluation indicates your idea can be linked to a reality — MHI's Custom Reaction service can prove the point through pilot plant experimentation.

Just recently, for example, MHI has turned inspiration into profit for a group of thoughtful steroid chemists. Confronted with the idea that perhaps the exceptional selectivity of one of the hydrides could solve the problem of specific functional group reductions in coddled complex molecules, MHI proved that lithium aluminum hydride was indeed the answer.

Perhaps you've got a hydride idea. Why not discuss it with an MHI technical service engineer? If it has merit, you can call on MHI's custom reaction team to develop it to a profitable process reality for you at surprisingly low cost!

Contact MHI technical service!

Information is readily available concerning: Calcium Hydride • Lithium Aluminum Hydride • Potassium Borohydride • Sodium Aluminum Hydride • Sodium Borohydride • Sodium Hydride Oil Dispersion • Titanium Hydride • Zirconium Hydride

PIONEERS IN HYDRIDE CHEMISTRY

M H I *Metal Hydrides Incorporated*

416 CONGRESS STREET, BEVERLY, MASSACHUSETTS

Easter eggs, colored with U. S. certified pure food colors, provide dye makers with a small but assured specialty market. Although sales are seasonal, dye packagers work year-round readying for $4-million-year market. Major market share goes to less than a dozen firms.

McCALL'S MAGAZINE

Easter Egg Dyes: Small but Colorful Market

In the last few weeks some $4 million in sales of packaged Easter egg dyes were rung up in U.S. retail stores. For specialties makers who supply and package certified food colors, the age-old custom of dyeing eggs during the Easter season provides a small but certain market.

Three distinct types of companies are involved in this business: basic dye makers that turn out food colors; distributors, most of which are flavor and fragrance companies that carry the colors as part of their line; and marketers who package the colors (latter are mostly in the food processing business with egg colors representing just part of their line). All emphasize that Easter egg coloring—while seasonal for the consumer—is a year-round project for them.

Six companies make U.S. certified food colors. Biggest are Allied Chemical's National Aniline Division and H. Kohnstamm & Co., Inc. (both of New York). Others are Warner Jenkinson (St. Louis); Bates (Lansdowne, Pa.); Sterwin (New York), chemical division of Sterling Drug; and Stange (Chicago).

Paas Dye Co., recently acquired division of Plough, Inc. (Memphis), has about half of the total egg dye business. The Fred Fear Easter Egg Color Co., Inc. (Brooklyn), with its Chick-Chick and Presto colors, and Best Foods Division of Corn Products Co. (New York), with Rit Easter Dye, are next largest. A half-dozen or so smaller companies make up the remainder of the field.

What's the Market: Out of the 2 million lbs. of food colors sold in '59, egg dyes accounted for an estimated 10-15,000 lbs. Egg colors are made from the 12 primary shades categorized by the Food & Drug Administration as FDC (food, drug and cosmetic) colors. In addition, over 2,000 secondary blends can be concocted from the basic dozen colors.

Prices range widely, depending on colors. At the bottom of the scale is Yellow No. 5 (sold on 500-lb. basis) at $3.30/lb.; higher-priced Blue No. 1 sells for $15.65. Secondary mixtures and lakes are less expensive.

Selling the Colors: Dye houses begin shipping colors in late fall directly to the retailer. The latter package and recertify the colors by February. Sales outlets—supermarkets, variety stores, drugstores, bakeries, door-to-door sales forces—do most of their business during the three weeks before Easter.

The most usual method of selling is on consignment; dealers may return unsold packages after Easter. Shelf-life of the dyes, however, is indefinite, so long as the dyes are not dissolved in water.

Egg colors are packaged in three forms: tablets made of salt, starch, and 1½ to 3% color; impregnated colored sheets of paper containing 3% pure food color, citric and phosphoric acid; and resin-containing liquids for multicolored eggs. Each tablet or sheet will color six eggs.

Most coloring kits hold six colors and also include paper cutouts, transfers, egg holders, etc. Selling price: 10-50¢.

Egg colors are exported mainly to Canada, South America, U.S. possessions and Army bases. Competition from Germany is too stiff to make European distribution profitable.

Where odor is a problem
use these SHELL SOLVENTS

SHELL SOL 71 AND 72

. . . have no odor, are ideal for interior finishes, polishes and cleaners. Shell Sol 71 offers slightly faster evaporation.

SHELL SOL 360

. . . much faster evaporation than mineral spirits, low odor, over 100° F. flash point.

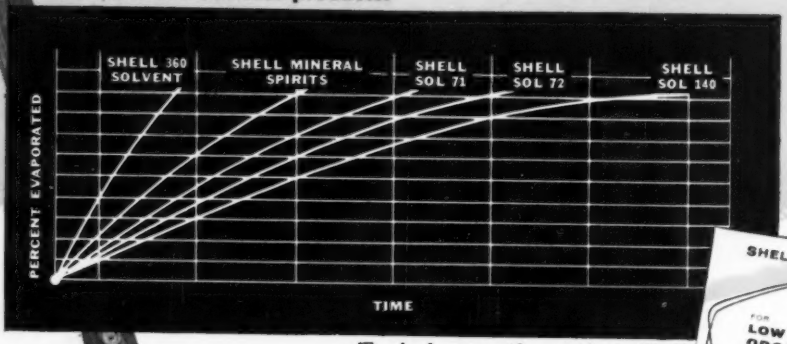
SHELL SOL 140

. . . a high-flash, slower drying solvent with unusually low odor.

SHELL MINERAL SPIRITS

. . . traditional distillation range, solvent power and drying. Mild odor.

These solvents are recommended for low odor and odorless products.



Typical properties of these Shell Solvents are contained in booklet shown. It will be mailed on request.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK

100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

Technology
Newsletter

CHEMICAL WEEK
April 16, 1960

New polymers, drugs and high-temperature lubricants top the list of developments reported at the 137th national meeting of the American Chemical Society in Cleveland, April 5-14. Among the highlights:

Esso Research and Engineering Co. reported that properties of poly-1,5-hexadiene are similar to those of lower polyolefins, but because it contains residual unsaturation, it can be cross-linked easily with conventional curing agents.

Dow has come up with high-temperature, flame- and chemical-resistant polymers based on diphenyl ether. The products, made by polymerizing the chloromethylated ether, can take the form of foams, laminates or moldings.

Hughes Aircraft discussed a family of polytriorganometalloxy metalloxanes that melt above 300 C, can be made into fibers and films.

Minnesota Mining and Manufacturing Co. is experimenting with a class of nitroso-modified fluorocarbons, which it calls the first "true" fluorocarbon elastomers (containing no hydrogen). The company's goal: a new, nonflammable synthetic rubber that is inert to gasoline, remains physically soft and resilient to —60 F. Main problem: low strength. Best prospect to date: a 1:1 copolymer of trifluoronitrosomethane and tetrafluoroethylene, which may find uses as an aircraft rubber (e.g., hoses, gaskets).

Goodrich Chemical's new elastomer, Estane 5740X1—a solid urethane that's been sold in small quantities for over six months—is now reported to have good radiation resistance; chief use: as a cable jacket.

Discovery of the first new group of highly active antihistamines in more than 10 years was reported by Ciba Pharmaceutical Products. The materials are derivatives of isoindonine. Most active member, called dimethpyrindene, is said to have more than twice the potency of earlier antihistamines. Two years of clinical testing shows dimethpyrindene to have only minimum side effects.

Pinworms, intestinal parasites, are the target of modified dihydrotriazines, a new drug family being investigated by Wellcome Research Laboratories. The Tuckahoe, N.Y., firm is also studying derivatives of 5-arylmercaptopyrimidines for use as hypotensive agents.

In high-temperature lubricant research, Battelle Memorial Institute reported that phthalocyanine, a solid, may be a key to successful operation of bearings in missiles and jets at temperatures up to 1350 F. In fluid lubricants, the Air Force's Wright Air Development Division has set a 600 F maximum temperature limit on the new tetraalkylsilanes. And, California Research Corp. stressed the good radiation resistance of

diarylalkanes, has successfully tested a fluid formulation of isopropyl-1,9-diphenylnonane in an aircraft piston pump.

•

Monosodium glutamate will soon be synthesized from acrylonitrile by Ajinomoto, Japan's largest MSG producer. The company plans to begin construction of an $11-million plant in July; production of 300 tons/month of MSG is scheduled to start up in early '62 *(see also p. 114)*.

The company figures the switch to synthesis will permit higher productivity, increased production and cost reductions that are not possible with processing methods now used. Reason: conventional fermentation and extraction from wheat or soybeans produce low yields (5-6%), are economically dependent on sales of by-products starch and amino acid.

For the synthesis of MSG, Ajinomoto will obtain acrylonitrile from an undisclosed Japanese petrochemical source. Processing will start with the conversion of acrylonitrile into an aldehyde by reaction with oxygen in a solvent, using an unnamed catalyst. The aldehyde will then be reacted with methane and ammonia to produce a compound that can be hydrolyzed to racemic glutamic acid. The glutamic is finally extracted to produce MSG. Ajinomoto has applied for U.S. patents on the process.

•

The Fluor Corp.'s new natural gas-treating process will be used by El Paso Natural Gas Co. at a 220-million-cu. ft./day sour gas plant to be built near Sheffield, Tex. It's scheduled to go onstream in December. The process, based on physical absorption with very low vapor-pressure organic solvents at near-ambient temperatures, reportedly is best suited economically to treating gas from the Brown-Bassett (Terrel County, Texas) wells of high (as much as 53%) CO_2 content.

•

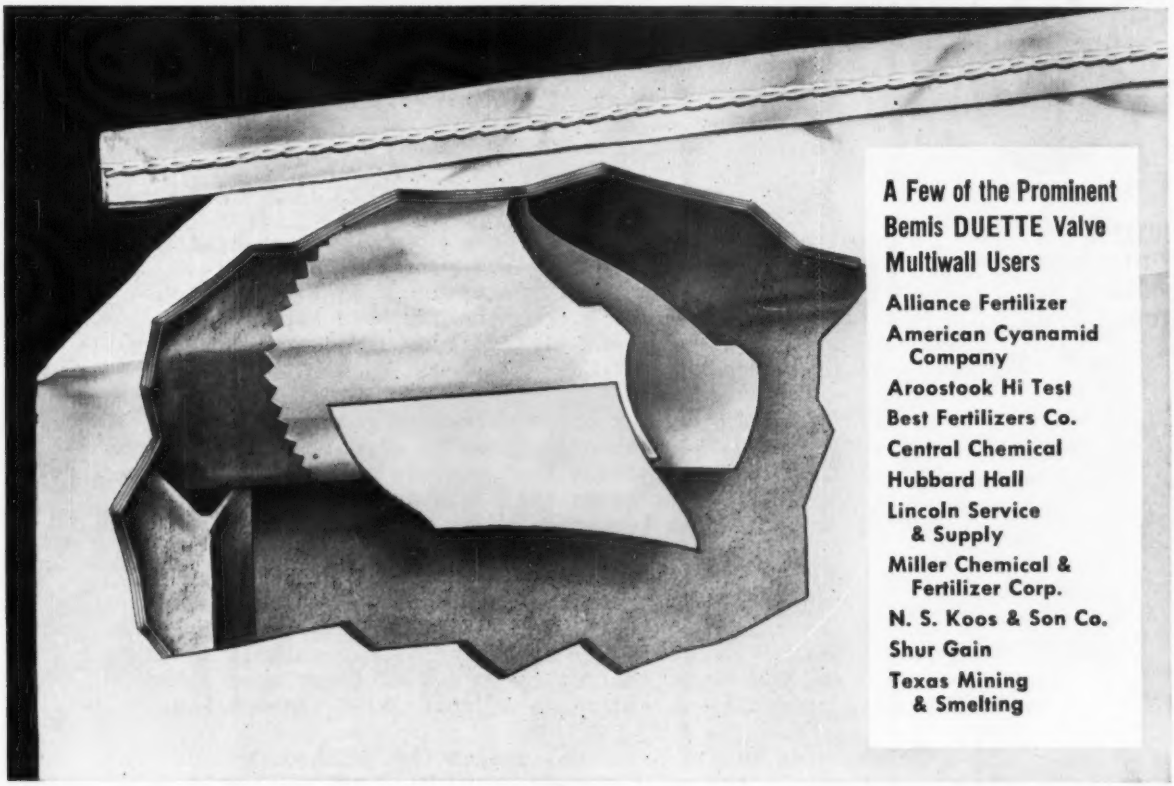
A chemically significant development in blast furnace operation was revealed by Pittsburgh Coke & Chemical Co. last week. PC&C is using the reducing value of its coke-oven gas (a 4% addition to the air supply) to supplement coke in its Neville Island blast furnaces. Pig iron production is boosted 12%; coke use is cut 15%. Other steelmakers are using natural gas to obtain similar results, and if the idea gains widespread usage, it will mean steel production increases without accompanying increases in coke-oven capacity and by-product coke-oven chemicals.

•

A more effective lure for the melon fly has been developed by U. S. Dept. of Agriculture researchers at Beltsville, Md. Called Q-lure [chemically: 4-(*p*-acetoxyphenyl)-2-butanone], it attracts male melon flies of all ages, lasts longer than previously used anisylacetone *(CW, Nov. 16, '57, p. 36)* from which it was derived.

Beltsville researchers are also developing a lure for trapping male gypsy moths. From the bodies of more than 500,000 female gypsy moths, they have collected and purified a single drop of the attractant. The chemical structure has been partly determined to be an ester alcohol, hydroxyacetoxyhexadecene. Goal: an inexpensive synthetic attractant.

Bemis *Duette*® Sewn Multiwall Sleeve Valves Have Been Experience-Proved

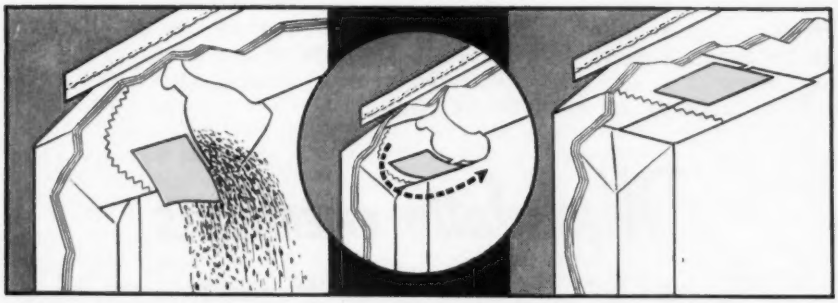


A Few of the Prominent Bemis DUETTE Valve Multiwall Users

- Alliance Fertilizer
- American Cyanamid Company
- Aroostook Hi Test
- Best Fertilizers Co.
- Central Chemical
- Hubbard Hall
- Lincoln Service & Supply
- Miller Chemical & Fertilizer Corp.
- N. S. Koos & Son Co.
- Shur Gain
- Texas Mining & Smelting

It's been more than three years since Bemis perfected the DUETTE, the multiwall bag valve-on-a-valve that gives double sift protection for granular, pelletized or pulverized products.

In that time, DUETTE Multiwalls have been used by many of the leading chemical and fertilizer manufacturers, with consistently gratifying results. The diagrammatic pictures show why . . .



WON'T CLOG . . . The Magic Yellow check flap falls freely aside from the valve slit. The sleeve won't choke or clog the packing spout.

POSITIVE CLOSING ACTION . . . This diagrammatic picture shows the action as the Magic Yellow flap starts to close over the valve slit.

CAN'T SIFT . . . When the bag is filled, the flap, acting as a check valve, completely overlaps and covers the valve slit, to stop sifting.

General Offices
408-J Pine Street
St. Louis 2
Sales Offices In Principal Cities

CHEMICALS OUTLOOK

April, 1960

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

PLURACOL V-10 . . . NEW POLYOL FOR NONFLAMMABLE HYDRAULIC FLUIDS

Wyandotte's Pluracol® V-10 . . . a new thickening agent for glycol-water type, fire-resistant hydraulic fluids . . . is available now in commercial quantities. It offers an outstanding combination of properties for this application . . . high viscosity, excellent viscosity control, and exceptional heat stability.

A high molecular weight polyoxyalkylene polyol, Pluracol V-10 is effective at low concentrations in glycol-water solutions — permits fluid formulations that contain as much as 35% water. This amount of water gives the fluid an extremely high autogenous ignition temperature.

The flash point of Pluracol V-10 polyol is 510°F. Its fire point is 535°F. It has withstood temperatures as high as 392°F. for long periods of time, in the absence of air, with very little color change. It is infinitely soluble in water . . . and may comprise from 1% to 10% of formulated fluids, making possible a broad range of controlled viscosities.

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Equipment Leasing Eases Lab Budgets

An agreement signed last week by Perkin-Elmer Corp. (Norwalk, Conn.) points up a growing trend: laboratory equipment — traditionally available only on straight "net 30" sale—is easier to rent. It means management will have access to a capital-conserving tool in research budgeting—and, if CHEMICAL WEEK's survey is borne out, instrument makers will have a potent "sales" tool.

P-E's new contract, with a national leasing company, will give its salesmen the leasing alternative to offer its customers. Not only is the plan novel for P-E, but it also breaks new ground for the leasing firm. Moreover, it brings to prominence a plan that has been getting quiet attention from instrument makers for years.

A broad check of lab equipment makers and suppliers by CHEMICAL WEEK shows where equipment leasing now stands:

- Very few rent or lease directly; if so, it's usually done for special reasons, such as to offer users a chance to make tests, to close an installment sale (when the rental is applicable to the purchase price), or, occasionally, to help a customer out of a tight spot.
- A number refer customers to outside leasing companies, and a growing portion of these are beginning to actively encourage leasing for customers who hesitate to buy.
- A great many of those equipment companies without an established policy in the matter are highly interested in the trend to renting.

And the leasing companies—of which U.S. Leasing Corp., Boothe Leasing Corp. (both of San Francisco) and Nationwide Leasing Co. (Chicago) are the largest—agree that lab equipment is a burgeoning fraction of their business. But it's still a much smaller share of their business than the leasing of production equipment (*CW, July 11, '59, p. 53*).

Nationwide's president, Robert Sheridan, estimates that total lab equipment leases outstanding at the beginning of '60 to all industry amounted to $22 million, about 7% of $307 million for all equipment.

Direct Rentals Rare: Direct rental by the equipment company to the customer is done only on rare occasions. P-E, for instance, provides for direct renting to companies that insist on a trial period, but the terms (5%/-month, 3-month minimum) are set to discourage all but the most urgent use of this provision. And, as further encouragement to sale, P-E allows two-thirds of the rental fee paid to be applied to the purchase price of the equipment. Net effect is a (rather costly) installment purchase.

Another company that provides for

Perkin-Elmer's McDonell thinks new tie-in with leasing firm will give his salesmen a valuable tool for selling hesitant buyers.

Fisher's Welch sees greater use of outside leasing firms as the answer to customers' increasing requests to rent lab equipment.

short-term rental and option-to-buy does so for a slightly different reason. Manton-Gaulin Manufacturing Co. (Everett, Mass.) offers its lab-scale homogenizers and colloid mills on a short-term rental basis mainly to provide test units with which customers can pilot new process steps. Ultimate goal: sale of production-size units. In case the customer wants to keep the small unit, however, the full rental fee (except for a 6%/year interest charge after the first two months) is applicable to the purchase price, and the unit is fully paid for in less than two years.

Other equipment companies affirm that they rent only under unusual circumstances. Tracerlab, Inc. (Waltham, Mass., and Richmond, Calif.), says that it has rented equipment on occasion, but only to accommodate a customer that could not afford to buy at the moment.

And Standard Scientific Supply Corp. (New York) agrees, says that it rented a $4,000 instrument to a medical researcher for three months' use in Uganda. Standard also pegs government contacts as a prime reason for renting lab equipment. Sometimes the project is only of a few months' duration; at other times it may run longer, but funds to purchase a needed piece of equipment may not be available until the contract is renewed for the next fiscal year.

The general reluctance of equipment companies to encourage direct renting is largely due to the amount of capital that would be tied up. Central Scientific Co. (Chicago) simply says it's in business to sell, not to lease. It points out that overhead costs—including inventory, rehabilitating and disposing of second-hand equipment—make direct leasing very unattractive. Braun-Knecht-Heimann Co. (San Francisco) also cites the lack of resale value on used equipment as its main reason for not renting.

Outside Leasing: When a prospective customer insists on renting, he is usually referred to one of the leasing companies. Applied Research Laboratories (Glendale, Calif.) is one equipment company that follows this practice.

Another is Fisher Scientific Co. (Pittsburgh). At a recent regional sales meeting, Fisher's director of marketing, George Welch, paid special attention to the option of using outside

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leasing companies. Fisher has been sending customers to leasing companies for about two years, but reports that the number of such cases is growing.

Once a rarely used alternative, outside leasing is now becoming a valuable sales tool for some equipment firms. Perkin-Elmer, under its new plan, will have a leasing rate card and brochure in each salesman's valise. Horace McDonell, sales manager for the instrument division, says he expects leasing to appeal not only to small firms but also to medium and large companies that may be struggling to justify a piece of equipment on a capital basis.

Current Expenses: Conservation of working capital is the key reason for leasing, according to the leasing companies. Leasing allows a company to charge its costly lab equipment to current expenses instead of capital outlay.

But one of the biggest advantages of leasing in the fast-moving field of laboratory equipment is the protection it offers against obsolescence, says Josephine Leider, Midwest sales director for Nationwide Leasing. At the end of the lease period, the company has the opportunity to renew the lease or to take out a new one on a more modern unit.

Watching Closely: Several equipment companies without specific programs for leasing or renting are watching the trend closely. Arnold Beckman, president of Beckman Instruments, Inc. (Fullerton, Calif.), says his company has had many requests for leases on expensive items and that he "wouldn't be surprised if the company went into this sort of thing one of these days."

Bausch & Lomb Optical Co. (Rochester, N.Y.) is another firm that shows interest. R. J. Sperling, manager of the laboratory and industrial sales department, says that, while B&L has no plans for future rental, it "has not rejected the idea, particularly for equipment costing $5,000 and up."

And R. L. Porter, sales manager of Autoclave Engineers, Inc. (Erie, Pa.), says, "In the future we may rent equipment not subject to rapid deterioration. We think it will be a good sales tool."

It's evident that renting of lab equipment is on the upswing, and that users can expect to hear more about it from visiting salesmen.

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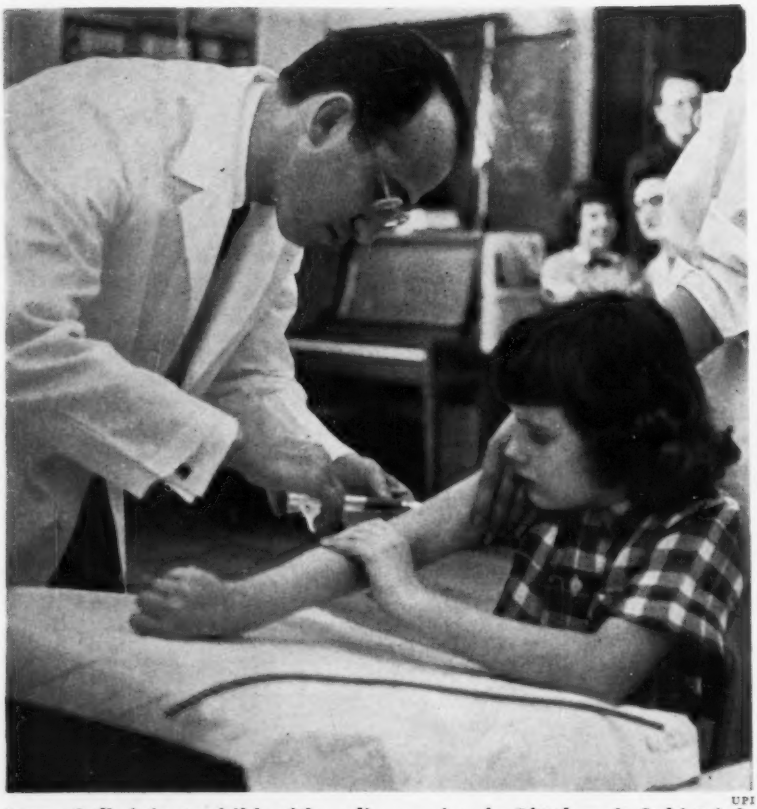


UPI

Jonas Salk injects child with polio vaccine in Pittsburgh field trials.

New Attack on Viruses

New hope for vaccines that will fend off baffling virus diseases emerged from recent meetings in Chicago, Ann Arbor, Mich., and Louisville, Ky. But the vaccines are also seen as only temporary measures until suitable chemotherapeutic agents are developed.

At Ann Arbor, poliomyelitis vaccine developers Jonas Salk and Thomas Francis* — reunited on the fifth anniversary of the report that declared Salk's vaccine safe and highly effective — told how knowledge gained from that vaccine is helping to uncover new ones. More-potent Salk vaccine, for example, is in the offing. Underscoring this point: 35,000 to 44,000 Pittsburgh, Pa., residents will receive a new type of Salk polio vaccine beginning next Monday (April 18). The test is designed to find out if the addition of mineral oil to the shot, which slows the rate at which it is absorbed by the body, will lengthen the time in which the body may build up immunity, thereby increasing the vaccine's efficiency.

Over-all effectiveness of three doses of vaccine over the past several years has been greater than 90%, Salk reveals. He also believes that it will be possible to raise the polio vaccine's potency even higher. Vaccine failures that have been observed are for reasons "now well known," according to Salk, and he sees no fundamental weakness in his discovery.

Salk looks for future vaccines to be made of "chemically purified components of the virus so as to evade the difficulties and enhance the values of present preparations."

Other virus researchers believe there is no reason why there should not be an antiviral vaccine for measles or for any type of virus disease, once the guilty virus is isolated. At the 44th annual meeting of the Federation of American Societies for Experimental Biology in Chicago this week, further progress in this direction was spotlighted.

Harold Ginsberg, associate professor of medicine at Western Reserve University, disclosed experimental work on the biochemical mechanism by which viral infections lead to cell damage, both in tissue culture and on leucocytes. Ginsberg tells CHEMICAL WEEK that a number of good antiviral vaccines are now undergoing tests, and predicts that one or more of them could be effective.

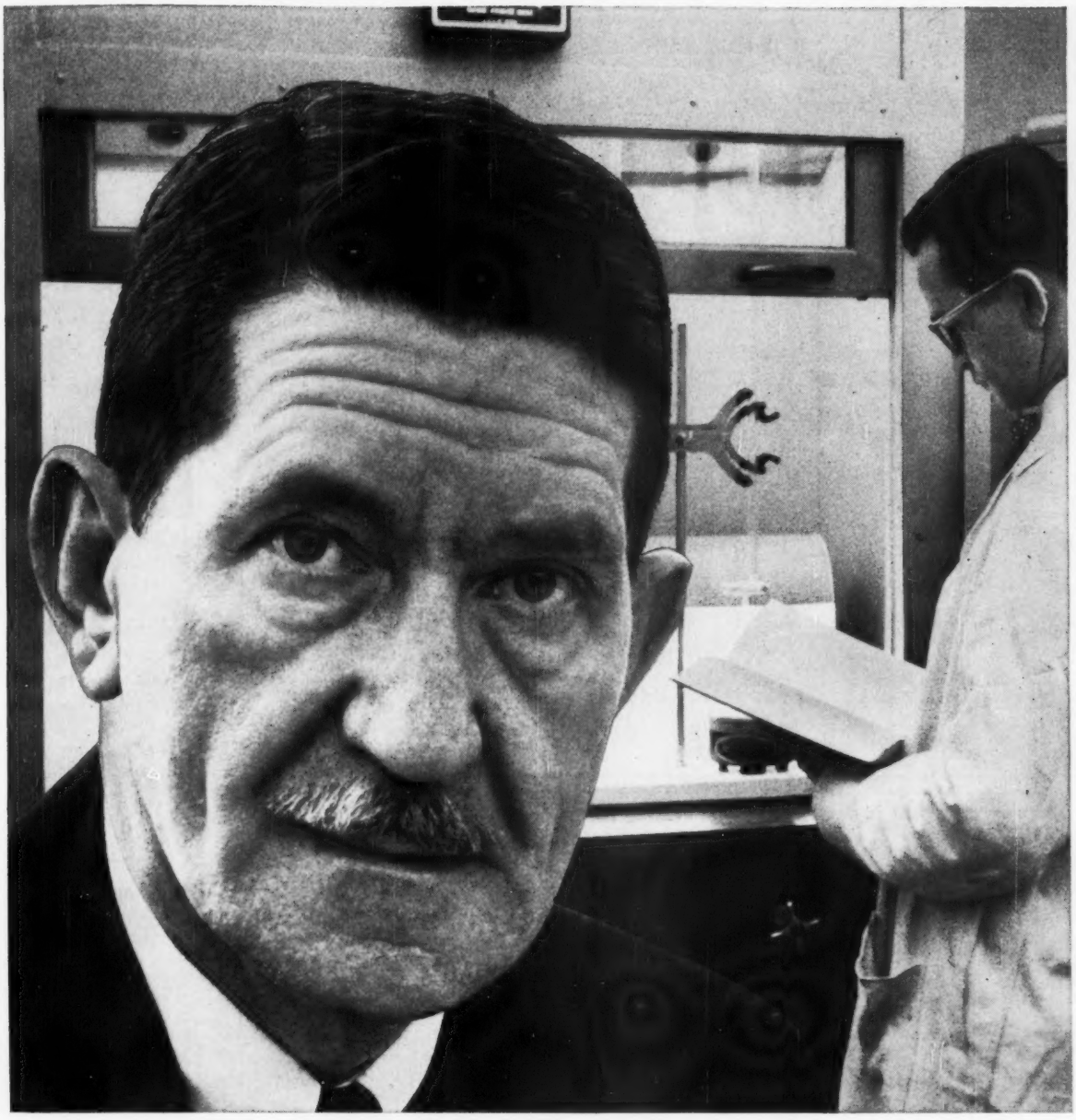
Like Salk, Ginsberg believes it would be reasonable to assume that the most effective vaccines of the future will be prepared from purified viral antigens. He doesn't feel that any vaccine will permanently wipe out viral diseases. "This is our best method of control of virus diseases at the present time," he says, "but the ideal method for prevention and treatment will be a chemotherapeutic agent."

Chemotherapeutants' Chance? A wave of research in this direction has turned up a wide variety of hopeful compounds, and is continuing to yield more. Examples include sulfonium salts of a series of 17-thiosteroids (U.S. Patent 2,840,557 to G. D. Searle & Co., Chicago); 2-aminoethane-1-acylsulfonamides active against Japanese encephalitis virus, N-acyl amino acids such as N-lauroyl-l-asparaginic acid, derivatives of phenylazonaphthalene polysulfonate — all reported by Japan's Dai-Nippon Pharmaceutical Co.; and Merck Sharp & Dohme's experimental 4-arylmethyl-4-aryl-5-oxohexanoic acid derivatives active against influenza virus.

Adding to the urgency of both vaccine and chemotherapy research is the discovery of more virus diseases, some of which are increasingly deadly. In the past 10 years, 80 new virus afflictions have been found, bringing the total to 300. Besides causing such familiar maladies as measles, mumps, smallpox and yellow fever, viruses are suspected of causing cancer and rapidly spreading liver-damaging hepatitis (60,000 cases of the latter are expected this year, up from 23,000 in '59).

Human volunteers are helping show leukemia is caused by a virus, raising

* Salk is Commonwealth Professor of Preventive Medicine at University of Pittsburgh School of Public Health. Thomas Francis, Jr., is chairman of Dept. of Epidemiology of University of Michigan School of Public Health.



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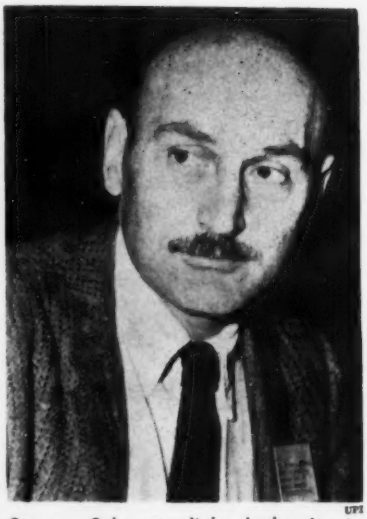


UPI

Steven Schwartz links leukemia to virus, raises hopes for cancer vaccine.

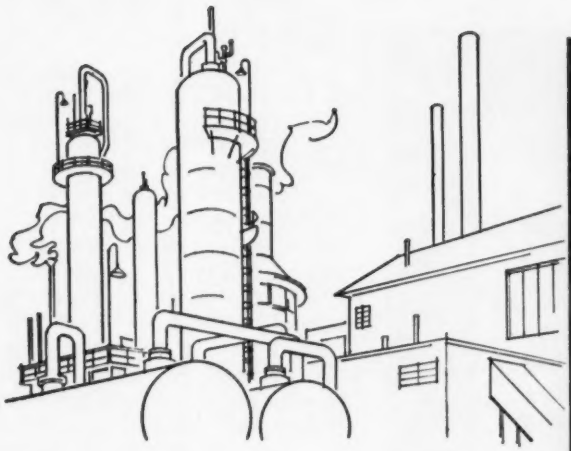
the possibility — still somewhat slim — that a vaccine can be developed to counteract the dreaded blood disease. Steven Schwartz, heading a team at the Hektoen Institute for Medical Research at Chicago's Cook County Hospital, reported on this work at the recent American Cancer Society seminar in Louisville, Ky.

Schwartz injected 14 jail inmate volunteers with an extract from the brains of persons who had died of leukemia. Blood, drawn from the prisoners a few weeks later, was found to contain leukemia antibodies. Mice injected with this blood did not get leukemia when first injected with human leukemic brain extract. Up to 80% of the mice not preinjected with antibody-containing blood died of leukemia when given leukemic extract.

Schwartz says, however, that the possibility of making a leukemia vaccine is remote at this time because there is no known way of growing human leukemia virus in a laboratory.

"Even if we were able to make a vaccine," he explains, "it wouldn't be the answer to human leukemia. We have never been able to reverse the disease process of leukemia."

Nonetheless, Schwartz's work, as well as that of many other cancer virus researchers (*CW, Oct. 10, '59, p. 105*), is building a foundation on which cancer vaccines may rise. And it's filling out the knowledge needed to eventually control the gamut of virus-caused maladies.



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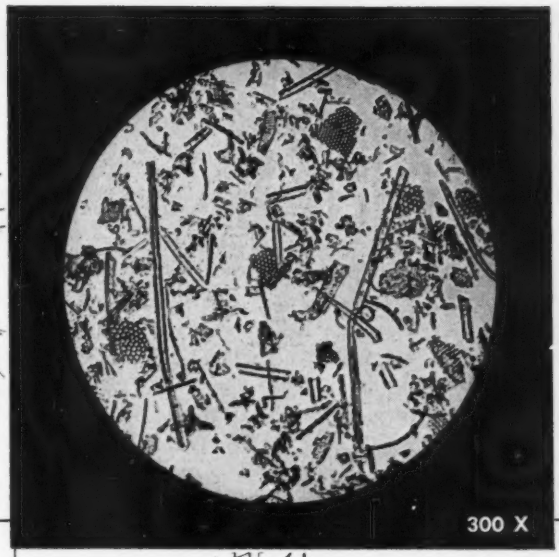

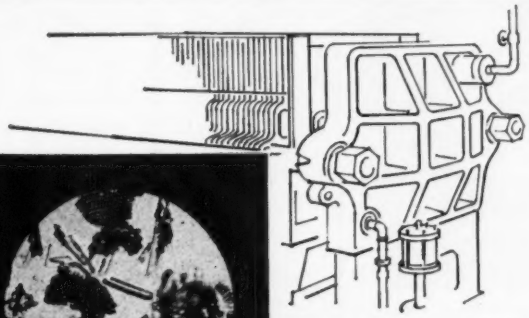

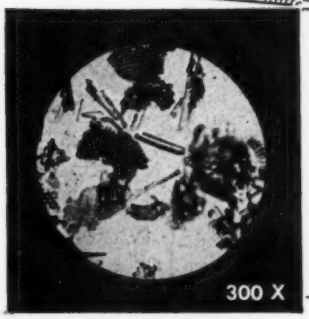

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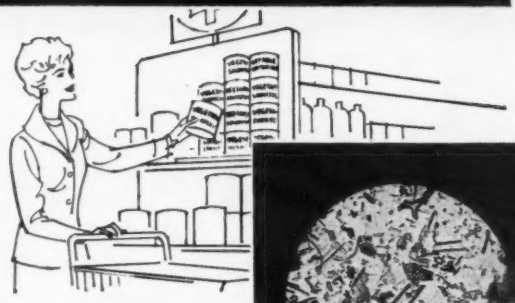

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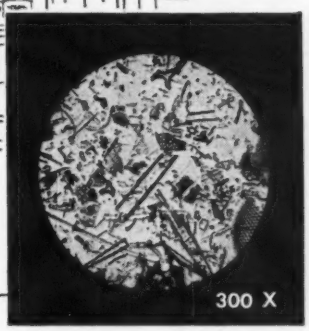

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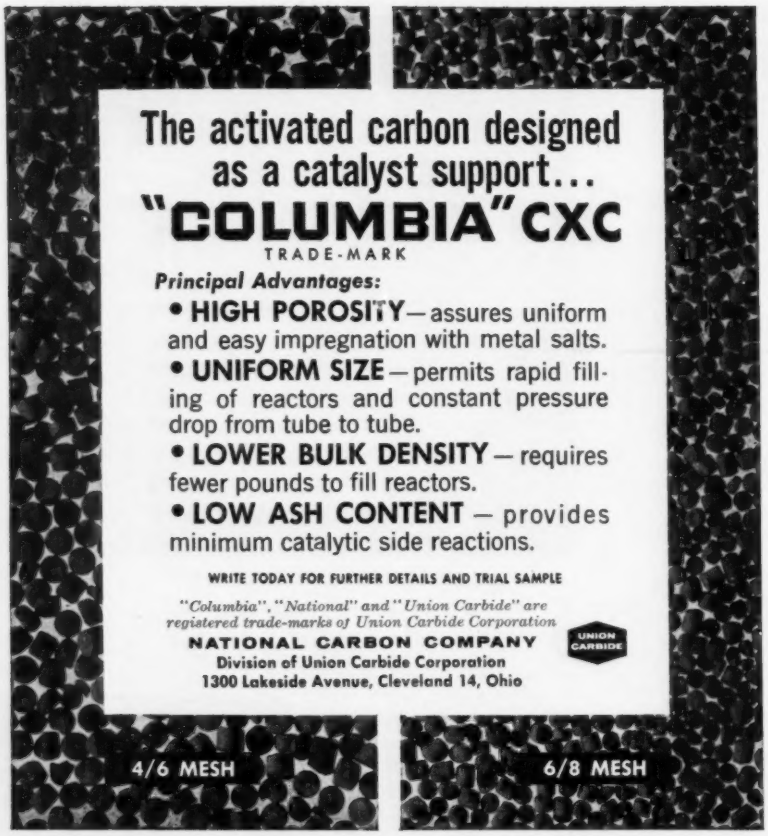
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• Scott Paper Co. has awarded a general contract to Wigton-Abbott Corp. (Plainfield, N.J.) for construction of Scott's new research center in Delaware County, adjacent to the Philadelphia International Airport. The center will provide an estimated 152,000 sq.ft. of space for the company's research and engineering personnel, will be ready for occupancy in May '61.

• Full-scale testing facilities for chemicals used in textile, pulp and paper, metallurgy, detergents and other applications are now in operation in Food Machinery and Chemical Corp.'s chemical research and development center at Princeton, N.J.

• Stauffer Chemical Co. has broken ground for its new, $1.6-million research center at Richmond, Calif.

• Abbott Laboratories is readying its new, nine-story research center (North Chicago) for occupancy. The new building doubles Abbott's research space.

• United States Rubber Co. (New York) is expanding its program of basic research in Europe by providing $120,000 to assist in support of European universities and to increase contact of its researchers with European scientific and engineering research activities.

PRODUCTS

Polyester Dyes: General Aniline & Film Corp.'s Dyestuff and Chemical Division (New York) has three new disperse dyes, aimed at dyeing polyester fibers. Genacron Blue 3R yields bright reddish-blue shades; Genacron Violet BN, bluish violet; and Genacron Blue GGL, greenish-blue.

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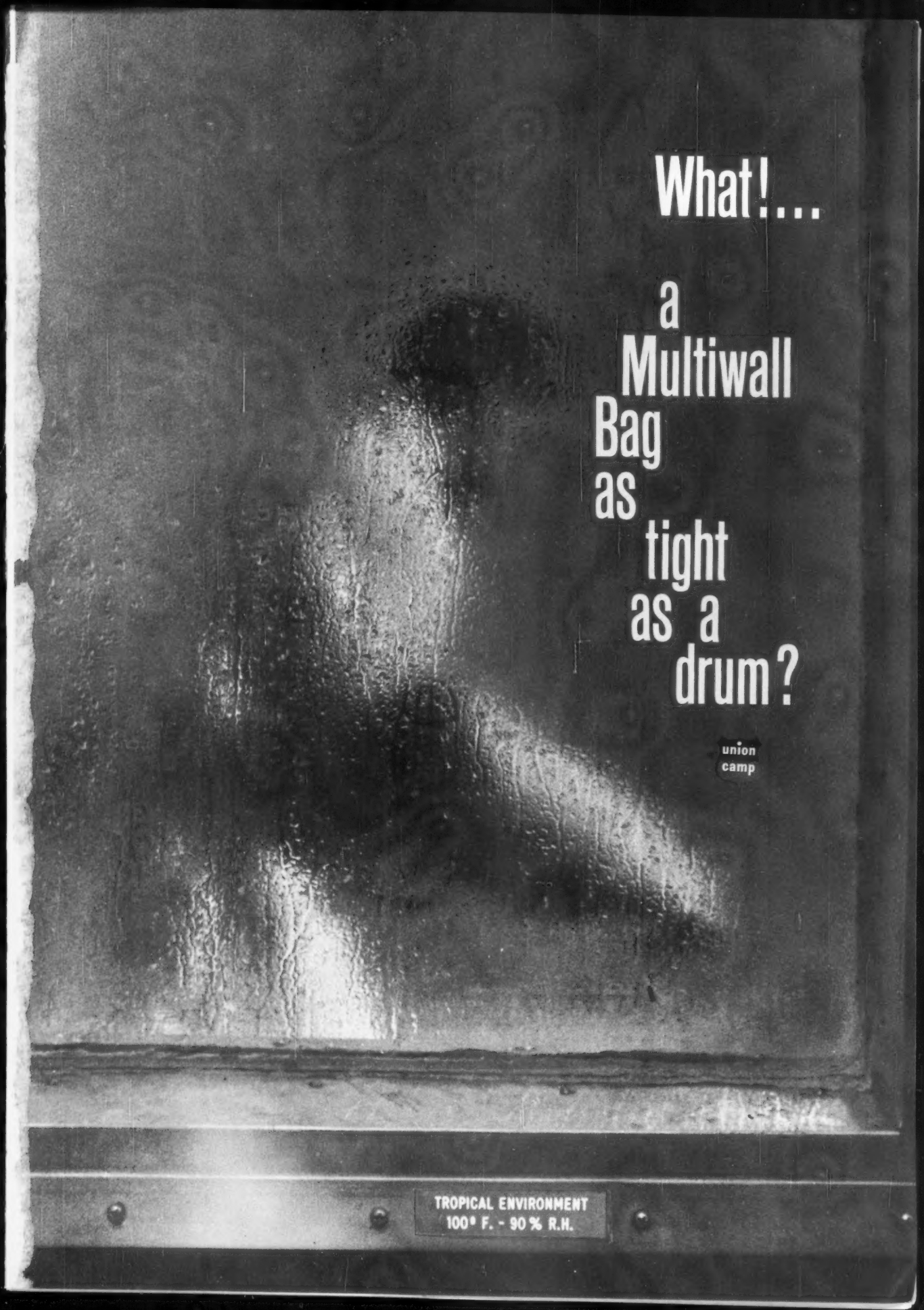
New Intermediates: Two new intermediates now being produced in small quantities are methylamine chromium sulfate, by City Chemical Corp. (132 W. 22nd St., New York 11), and 2-hydroxy-4,6-dimethylpyrimidine hydrochloride, by B. L. Lemke & Co. (Lodi, N.J.).


What!...
a
Multiwall
Bag
as
tight
as a
drum?
union
camp
TROPICAL ENVIRONMENT
100° F. - 90 % R.H.

Union's new UNISEAL* Bag locks liquids in

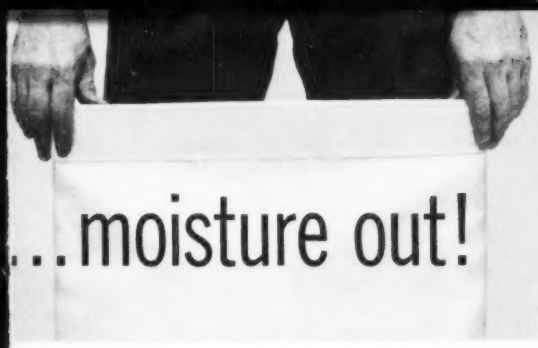
Completely heat sealed Multiwall offers outstanding new savings in packaging, shipping, storage, handling... replaces many needs for conventional fibre or metal containers.

A major new milestone in packaging history has just been reached. Now—for the first time—you can ship semi-liquids, high cost food products, and hygroscopic chemicals in a Multiwall bag without fear of moisture vapor transmission—*in or out!*

The UNISEAL Bag*—latest development of Union-Camp Research—is an airtight, watertight container. Field tests have proved that many highly hygroscopic products can be transported safely and economically in this amazing new Multiwall bag without picking up moisture.

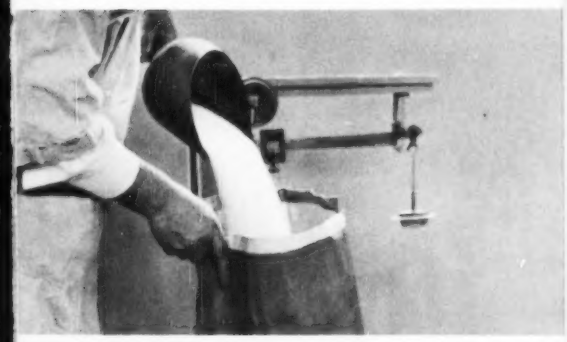
*PATENT PENDING

union camp



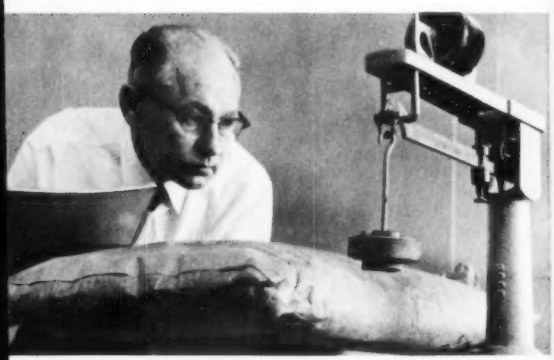
...moisture out!

The secret of UNISEAL is this perfect closure. Inner seam and bottom are heat sealed at factory. You heat seal, paste and tape top closure. Result: an airtight multiwall!

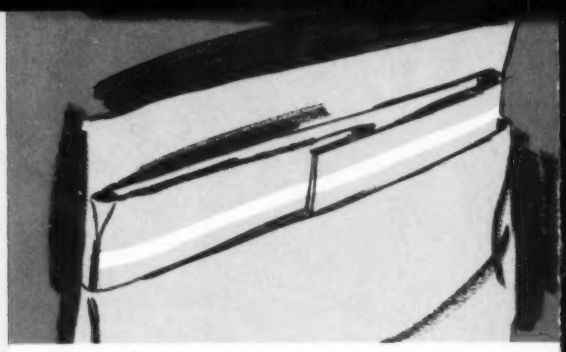


a *Four weeks ago*—test bag is filled with measured weight of calcium chloride, heat sealed...

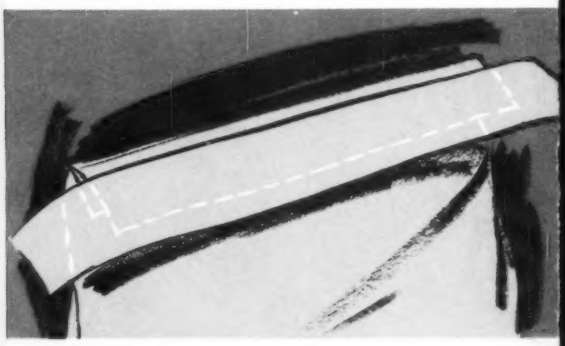
b ...and placed in 100°F.—90% RH tropical test room.



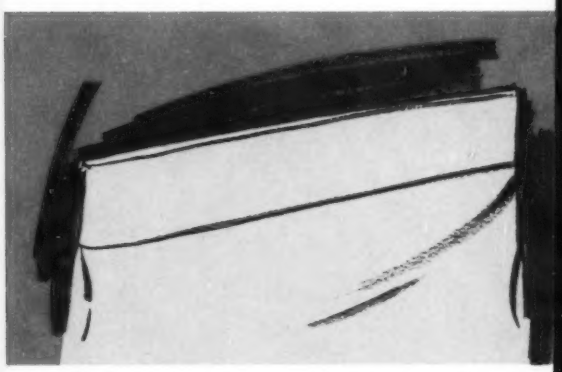
c *Four weeks later*—checked against original weight—and still bone dry!



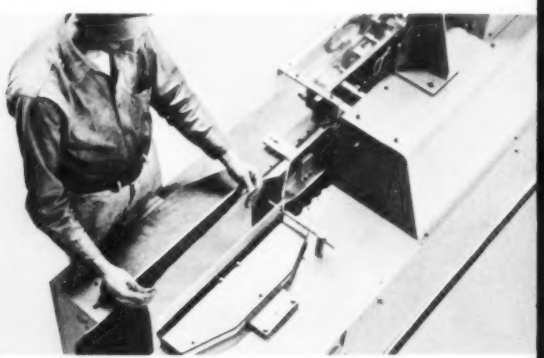
UNISEAL's stepped-end arrangement which allows you to apply heat seal *directly* to poly-coated inner liner. 1



After filling bag and heat sealing, tape and glue are applied. The stepped end is then folded against face of bag... 2



...forming the perfect airtight, watertight, moisture vapor proof "triple seal". 3



The UNISEAL closing machine† automatically heat seals, pastes lip, and applies gummed tape—at rates up to ten bags a minute. Right in your own plant!

† PATENT PENDING

Completely heat sealed—inside!

The UNISEAL Bag is a flat tube made in two or more plies. It is constructed with a polyethylene-coated *inner* wall which is completely heat sealed inside—at the seam and bottom closure. This perfect-closure method is the bag's chief advantage. It enables you to heat seal filled bags at production line speeds.

Once sealed—no air or liquid can enter or leave!

The inner liner is an *integral part of the bag*. It consists of polyethylene extruded on aluminum foil, then laminated to kraft. Or, it may be a single layer of polyethylene extruded directly on kraft, depending on the type and degree of barrier protection required.

Whichever barrier combination you use, the bag is sealed positively *inside*. And it can be done quickly, economically—*automatically*—right in your own plant.

See how you save with the new UNISEAL®!

...in initial cost

Your savings start immediately with the UNISEAL Bag. No other container on the market offers UNISEAL's advantages or does a comparable protective job at such low cost.

...in warehousing

New UNISEAL Bags (both empty and filled) require minimum warehouse space... can save you 500 per cent in storage area as compared with fibre and metal drums or other bulky containers.

...in shipping

No more round containers in square box cars! UNISEAL Bags stack snugly, provide more cargo per carload. Low tare weight gives you outstanding freight savings.

...on product identification

No more unstuck labels—blurred stencils! UNISEAL offers you all the advantages of Multiwall printing. A superb surface—either white or unbleached kraft.

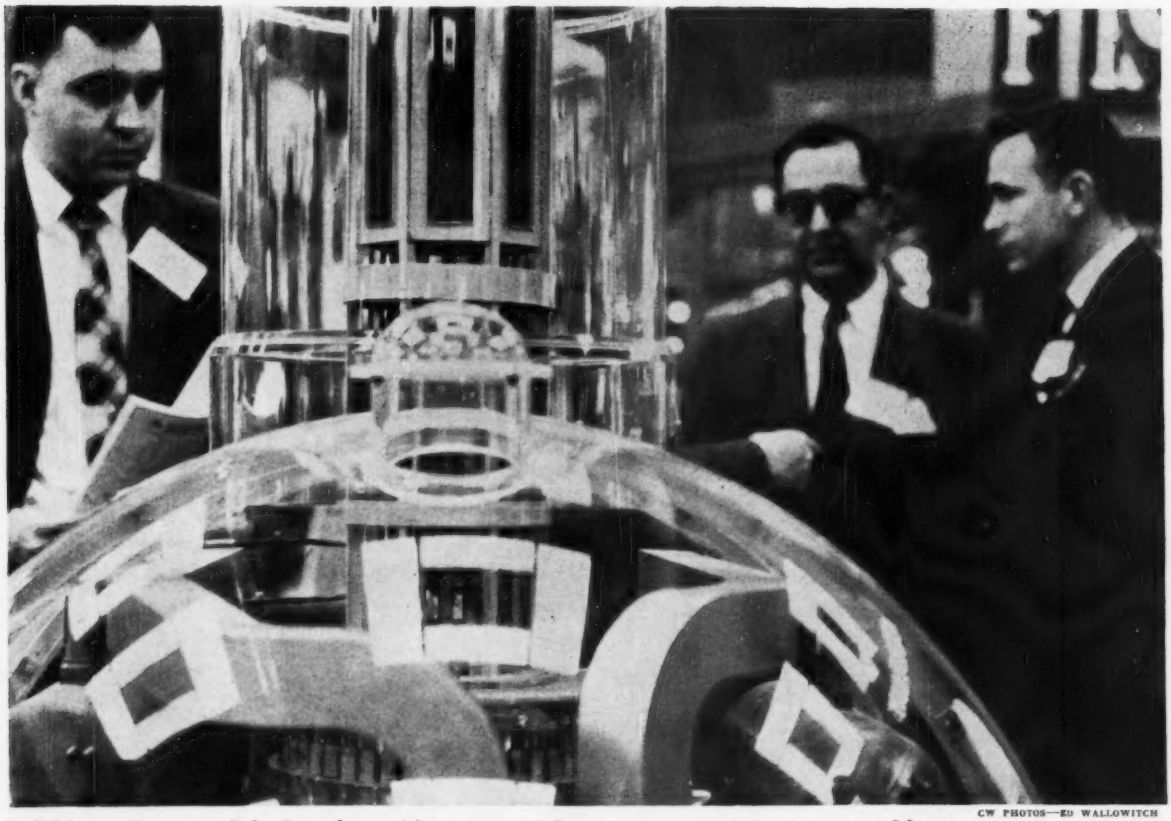
Test it yourself!

Union's new UNISEAL Bag is being field tested today by leading firms in the chemical, food, plastics and related industries who formerly packaged their products in fibre or metal drums and other bulky containers. Try a test shipment yourself. Union packaging engineers will be glad to show you how the UNISEAL Bag can be quickly, easily and economically adapted to your own operation.

Write for complete details.

union camp UNION MULTIWALLS

Union Bag-Camp Paper Corporation
233 Broadway, New York 7, N.Y.



CW PHOTOS—ED WALLOWITCH

Exhibits such as model of nuclear ship reactor (above) stress atomic energy achievements as . . .

Commercial Wares Star in Nuclear Show

Management men who braved inclement spring weather last week to attend the Nuclear Congress at the New York Coliseum detected a stronger undercurrent of commercialism than has prevailed at most of the earlier trade shows of the atomic industry. Equipment makers, material suppliers, reactor designers and fuel processors alike were hawking goods and services designed to bring in profits—not just prestige. (Also see Viewpoint, p. 11.)

Although CPI exhibitors were in the minority, their displays of new products, tailored for nuclear applications, were indicative of the efforts they're making to broaden the scope of private participation in the nuclear field. Mallinckrodt Nuclear Corp., for example, exhibited several new varieties of uranium oxide fuel pellets developed in the research laboratory of its Hematite, Mo., plant. And Nuclear Materials & Equipment Corp. (Apollo, Pa.) showed off a similar line of fuel materials to which it will soon add the first commercially produced plutonium oxide fuel.

Commercial interest of foreign chemical companies in the nuclear field was also very much in evidence. One of the most impressive exhibits at the show was that of a group of French companies—including such well-known chemical firms as Saint-Gobain, Kuhlmann and Pechiney. Also, the rapid development of France's atomic industry was underscored quite dramatically by the recent test explosion of the country's first A-bomb.

Progress Reports: Several promising commercial applications of nuclear materials and radiation were highlighted in the 60 papers presented during the four-day technical sessions of the congress. The increasing utilization of radioisotopes—still considered the most commercial phase of the atomic energy program—was explored in detail at a one-and-a-half-day seminar for nontechnical management men.

Paul Aebersold, director of AEC's Office of Isotope Development, reported that Oak Ridge National Laboratory alone has distributed close to one million curies of radioisotopes, valued at more than $19 million, over the past 15 years. To accelerate industrial applications of these materials, AEC is currently supporting a new Isotopes Development Program subdivided into four major categories —technology, industrial process radiation, training and production. Although radioisotope production is strictly a government operation, Aebersold reported that AEC's stepped-up activities have accelerated complementary undertakings by

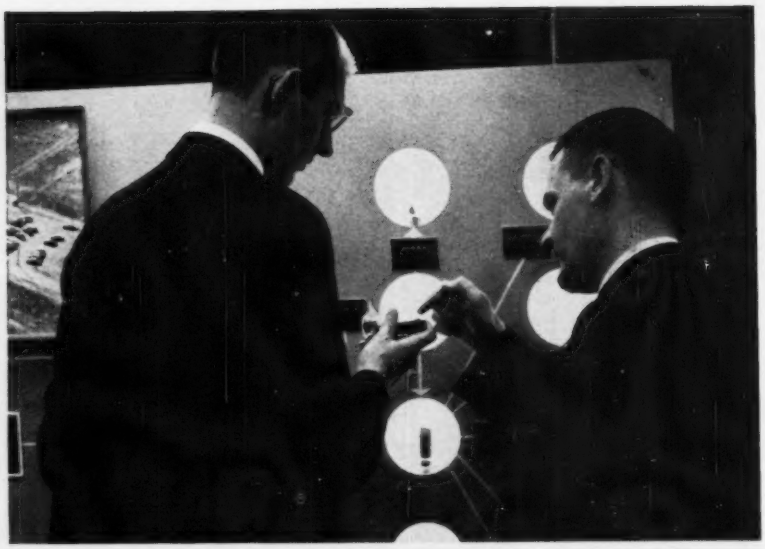
private industry. Such government-industry cooperation, he concluded, will bring many unforeseen and undeveloped benefits of radioisotopes to earlier realization.

New Nuclear Device: An outstanding example of new uses for radioisotopes—isotopic power generators—was described by The Martin Co.'s Jerome Morse. As the heat source in a thermoelectric generator, isotopic "fuels" afford unique advantages of compact size, high power density, reliability over long periods of unattended operation. Although these characteristics are not required for large thermoelectric generating facilities currently under development (*CW, April 2, p. 79*), they are vital to power systems being developed for military applications and space vehicle installations.

According to Morse, the primary chemical processing problems involved in the production of isotopic fuels are (1) the separation of specific isotopes from the large quantities of gross fission products that remain after re-usable uranium has been recovered from spent nuclear fuel, and (2) the "hot" processing of the isotopic material into a chemically stable, unleachable compound. Because individual fission products vary greatly in half-life and in the quantity and type of radiation produced, said Morse, only a few of the more than 200 radioisotopes produced by the fission process are suitable for isotopic power use. One of the likeliest candidates is strontium-90.

The compound currently considered the safest means of locking this hazardous isotope into a stable fuel form is strontium titanate. This material melts at 3038 F, produced no detectable trace of dissolved strontium in fresh water after a 100-day immersion test. Over the same test period, sea water leached out measurable quantities of strontium, but not enough to be detected in the ocean where natural mixing and dilution would rapidly disperse it.

To further prevent radioactive contamination, strontium titanate pellets would be encased in Hastelloy C cladding of sufficient thickness to resist corrosion-failure in sea water for about 500 years. And in that length of time, Morse pointed out, the strontium-90 would decay almost completely into stable, nonhazardous zirconium-90. Because of the exceptional stability exhibited by titanates, they're also being considered as a means of disposing of other hazardous fission products in high-level wastes that must now be stored, in less stable form, in heavily shielded underground containers.



Commercial offerings ranged from atomic fuels and chemicals . . .

. . . to new instrumentation and hardware tailored to nuclear use.

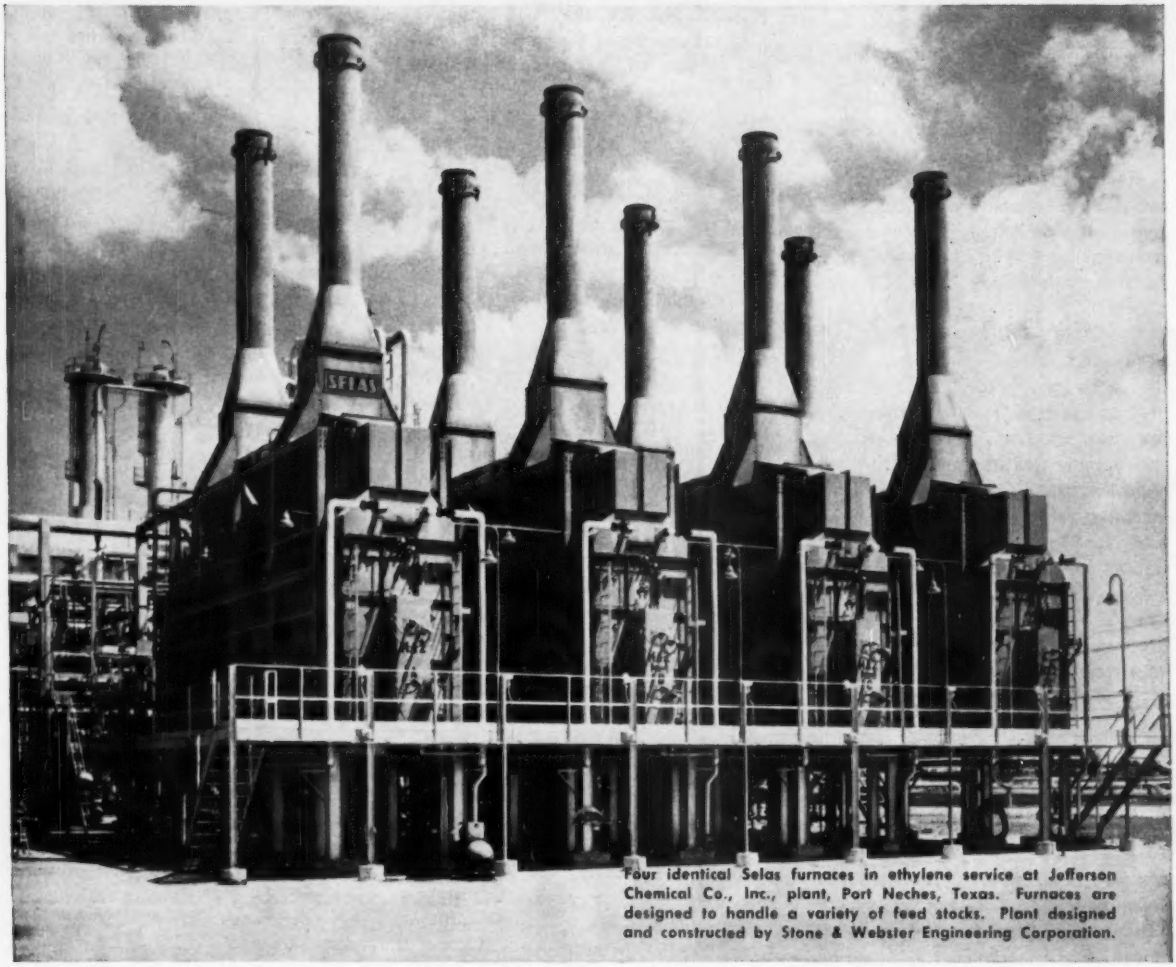
Another processing technique that may ultimately simplify waste disposal and containment problems was described at the meeting by Benjamin Johnson of General Electric Co.'s Hanford staff. It's a spray calcining operation by which slurries and aqueous solutions of fission products can be concentrated into stable solids of greatly reduced volume (*CW Technology Newsletter, April 9*). Here's how the experimental spray calciner at Hanford operates:

Heart of the unit is an 8-in.-diameter, 10-ft.-long column, constructed in three sections—top and bottom segments of stainless steel and a center segment of Inconel.

Liquid wastes are sprayed in at the top of the column through an atomizing nozzle, using superheated steam as an atomizing fluid. The liquid component of the waste is vaporized in the heated upper portion of the column; solids, in the form of dried powder, fall into a filter section which removes them from the effluent gas stream. The powdered waste is finally collected in a receiver sealed to the filter section, may subsequently be heated to its sintering or melting point to further consolidate it into a clinker-like mass.

Compared with other waste calcin-

JEFFERSON CHEMICAL
relies on Selas Gradiation® Heating for
ZONE CONTROL • PRECISENESS • UNIFORMITY



Four identical Selas furnaces in ethylene service at Jefferson Chemical Co., Inc., plant, Port Neches, Texas. Furnaces are designed to handle a variety of feed stocks. Plant designed and constructed by Stone & Webster Engineering Corporation.

In ethylene production, the following inherent features of Gradiation heating have been translated, at Jefferson Chemical Co., into . . . *Longer on-stream periods . . . fixed amount of production with less feed stock . . . greater depth of cracking when limited by actual metal temperatures:*

- Zone Control . . . Duradiant® burners can be adjusted to desired heat pattern, in horizontal rows, to produce optimum reactions in pyrolysis.
- Uniformity of heating . . . even-heat distribution along and around tubes, increases tube life by eliminating hot spots, minimizing coke formation.
- Preciseness of heating . . . complete combustion within Duradiant burner cup permits placing burners close to tubes . . . achieving fast heat-up and instantaneous response to controller demand.
- Versatility . . . Gradiation heaters can handle a variety of feedstocks, interchangeably, under optimum conditions.

May we arrange for a Selas field engineer to discuss your heat processing needs with you? For this service . . . without cost or obligation to you . . . or for a copy of Bulletin "Gradiation Heating for Petroleum and Chemical Processing," write to Mr. Kitzen, chief process engineer, Fluid Processing Div., Selas Corporation of America, 94 Dreshertown Road, Dresher, Pa.

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Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

ing methods, said Johnson, the new spray technique offers several unique operating advantages, such as: efficient heat transfer at very high operating temperatures; stability of operation; lack of moving parts that would complicate maintenance; low capacity requirements for off-gas treatment; ability to heat waste to its melting point without problems of agglomeration; relative independence of feed composition.

Radiation Processing: Gamma irradiation in chemical processing has found little acceptance, except for the cross-linking and graft-polymerization techniques developed by plastics producers.

But there's still considerable interest in the use of ionizing radiation for foods, agricultural products and pharmaceuticals. The ability to sterilize heat-sensitive products without endangering texture, flavor or biological properties appears to be strong incentive for continuing development programs. In a report on commercialization technology and economics in radiation processing, Curtiss-Wright Corp.'s H. F. Kraybill and D. C. Brunton pegged reduced costs and improved efficiency as key economic goals of current studies.

Radiopasteurization of foods is technically and economically feasible and should lead to early commercialization of radiation processing, said Kraybill and Brunton. Although plans for large-scale testing of food irradiation by the Army Quartermaster Corps have been temporarily shelved, Aebersold predicted low-dosage radiation to extend the freshness of certain food products would be in use by '65. AEC recently launched a $5-million program to develop this use of radiation (*CW Washington Newsletter, April 9*), says it's now feasible to kill some decay-causing organisms with dosages that are harmless to humans and which do not alter the food.

Commercial Goals: While private nuclear processors are keeping a watchful eye on the progress of long-range government-sponsored research projects, they're not counting on any major undertakings based solely on hoped-for results. Instead, they're concentrating on profit-motivated operations, switching a larger share of commercial nuclear business into the hands of private industry.

Cutting Deeper into Crudes

Last week brought a promise that petroleum cokers will take a still bigger bite out of the fuel oil and asphalt markets and that they will generally help refiners boost their revenue from the bottom of the crude oil barrel. The promise comes with Esso Research and Engineering Co.'s new version (called Model II) of its fluid coker.

The profits in petroleum coking depend primarily on the price spread between fuel oil and gasoline and middle distillates. When the spread is small, refiners use vacuum distillation to separate fuel oil and asphalt; when it is big they let them stay together and feed them to a coker, where they are cracked to extinction. Coker products are refinery gas, gasoline, middle distillates (naphtha, jet fuels, and gas oil) and coke. And Esso's latest unit is claimed to reduce coker on-site investments 65%, utilities 35%, and operating costs 75%, while increasing the over-all profitability by about 75%.

Ten years ago the most profitable coking process was called delayed coking: heavy oils were heated quickly and dumped into coke drums, left there until all had cracked. Parallel drums were used alternately and the coke removed by batch. This process depends on low fuel oil prices.

Then, in the early '50s, Esso came out with its first continuous fluid coker, in which hot seed-coke pellets were mixed with the heavy oil, which cracked to extinction and formed layers of coke around the seed pellets. Key to this process was a fluidized solids system for handling the coke pellets. Currents of hot air, steam and oil vapors were used in separate parts of the process to suspend pellets in a dispersed phase and transfer them between the coker tower and the regenerator.

The mechanics of this type of solids-handling requires tall equipment, however, and the top of the coker was sometimes 150 ft. high, while the giant 40-ft.-long regenerator had to be suspended with its bottom some 70 ft. in the air.

In spite of this the process was profitable, and six units were coking about 70,000 bbls./day before '56. These units, says Esso, were designed nearly simultaneously on the basis of pilot-plant data; consequently, there was never opportunity to use commercial experience to improve successive designs. As a result, there had been no great change in the basic fluid coker design prior to the Model II.

Model II: Essentially, the fluid coker has four sections: (1) the coker in which the heavy oil feed is coked onto seed-coke pellets, (2) the scrubber, where coke fines are washed out of the cracked vapors, and a recycle stream of heavy oil is returned to the coking chamber, (3) a fractionator, where product vapors leaving the scrubber are separated, (4) the regenerator, where the outside layers are burned off the coke pellets, heating them until they are hot enough to crack the heavy oil on contact.

In redesigning these sections:

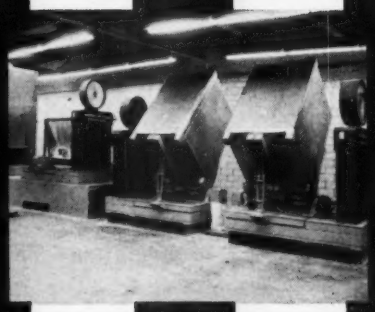
- The over-all height was lowered by taking the heavy gas oil fractionating section from the top of the coker and putting it on the ground, at the bottom of the fractionating tower. Justification: carryover of coke fines has been smaller than originally expected. In the Model II, the fractionator separates four products: gas and naphtha overhead, light gas oil as a side stream, and heavy gas oil as bottoms.
- The heat exchange system was improved by (1) mixing the cool fresh feed with the recycle to the coking chamber instead of cooling the recycle stream against water, (2) generating high-pressure steam with the hot, heavy gas oil instead of cooling it with water, (3) generating low-pressure steam with the light gas oil instead of water-cooling it.
- The cost of the coke-handling system was cut by lowering the regenerator, reducing the number of aeration injection points to the solids transfer system, and using smaller transfer lines.

In addition to these changes, the Model II fluid coker carries two optional features designed to offer refiners increased flexibility: (1) by increasing the operating pressure, it is possible to mount a waste gas turbine on top of the regenerator; (2) it is possible to feed atmospheric crude

BULK HANDLING PROBLEMS SOLVED:

the EFFICIENCY of "automation" + the FLEXIBILITY of unit containers =

TOTE* SYSTEM



Compare Tote—a complete, mechanical, automatic bulk handling system based on metal containers plus filling and discharging equipment—with a "push-button" fixed storage bin system. You'll find that Tote offers the advantages you want:

- Compact storage
- Surge capacity between processing and packaging operations
- Accurate and automatic weighing and blending

The labor cost of operating a Tote System is no greater, while the *installation cost of a Tote System is much less.*

IN ADDITION, Tote System retains the flexibility of unit containers:

- *Flexibility in Transportation:* Tote Bins can be shipped by rail or truck, or they can be retained in the plant and filled from bulk hopper cars or trucks.
- *Flexibility in Plant Layout and Procedures:* Tote System can be adapted easily to future requirements. Plant layouts can be changed simply by re-locating discharge stations. Operations can be expanded merely by procuring additional Bins. And the Bins can be used interchangeably for different products.

Why not let our engineers survey your plant at no obligation? Meanwhile, write for new catalog containing complete details.

TOTE SYSTEM, INC.

820 So. 7th, Beatrice, Nebraska

*Tote and Tote System Reg. U.S. Pat. Off.

distillation tower bottoms directly into the scrubber, bypassing a vacuum tower.

Net result of these changes is to once again allow refiners to revise the calculations by which they estimate the return on investments from fluid coking units. In '56, a spread of $1.59 between the average price of product and feed stock was required for a return of 80%/year after taxes; with the Model II, a spread of about $1.30 is required for the same return. More realistically, when coke is selling at $5/ton and gas oil at 7¢/gal., the return on the Model II will be about 57% of the investment after taxes.

Boost for Solid Fuels

The art of processing solid rocket fuels took a step forward last week as Thiokol disclosed that it's now successfully operating a continuous mixing process at its Longhorn Division (Marshall, Tex.).

Known to be in the final stages of development last year (*CW Technology Newsletter, Sept. 26, '59*), the continuous propellant-blending operation opens the way to faster casting of uniformly high-quality rocket motors with increased safety and economy. Previously, solid rocket fuels could be mixed only in batches, usually no more than about 3,000 lbs. at a time.

Key to the continuous mixer is a modified rubber extruder. Raw materials are fed to hoppers discharging into a screw conveyor, which mixes them, drives out air bubbles, forces the mixed propellant out of the extruder into the motor casing. The mixer, screw conveyor, and housing are designed for easy alteration to meet the mixing requirements of different types of propellants.

Rockets using the continuous mixer are operational missiles such as the Air Force Falcon, the Army's Nike Hercules and Lacrosse, and small rockets such as those that give spin to the Honest John missile.

Normal Operating Procedure: Solid rocket propellants are usually manufactured, mixed, and cast directly into the rocket engine at the propellant manufacturing site. When filled with fuel, the engines are then shipped to the launching site, are easily stored and handled.

Better Break on Ammonia

A new processing twist for recovering anhydrous ammonia from coke-oven gas was described in Chicago last week before the American Institute of Mining and Metallurgical Engineers. The scheme opens a way for coke plants—which now turn out ammonium sulfate as a by-product—to compete more favorably with synthetic nitrogen products.

M. O. Holowaty and H. L. Taylor of Inland Steel Co. (East Chicago, Ind.) told how revisions to existing coke ovens could be made to recover ammonia as a 95% anhydrous product, leading to the production of 120,000 tons/year of ammonia from the nation's coke facilities.

Key to the new process—which has been proved out in Inland's pilot plant—is an ammonium bisulfate solution that can be regenerated and recycled.

How It Works: Cooled raw gas from the coke ovens is passed through a conventional absorption tower. Here the rising gases are washed with a descending saturated solution of ammonium sulfate containing 8% ammonium bisulfate. The ammonia in the gases is absorbed, reacting with the ammonium bisulfate to form ammonium sulfate and water. Because the solution is saturated with ammonium sulfate, any additional product that forms in the reaction will precipitate.

The ammonium sulfate precipitate leaving the bottom of the tower is separated by decantation, dried on draining tables and in centrifugal dryers. It's then transferred to a decomposition chamber and heated to 650 F. At this temperature it decomposes into ammonia gas and molten ammonium bisulfate.

The ammonia passes through gas cleaning equipment, is dried and compressed. The molten ammonium bisulfate is returned to the solution passing to the top of the absorber.

Adding Up Advantages: The process is said to have several advantages:

- There's no net consumption of sulfuric acid. In conventional coke-oven plants, the sulfuric acid is 40-60% of the total manufacturing cost, depending on the size of the plant.
- Existing facilities can be used. With the exception of the ammonia dryers, compressors and decomposition chamber, all equipment required for making anhydrous ammonia is common to existing plants that produce ammonium sulfate by sulfuric acid absorption.
- It's flexible. A plant designed to produce anhydrous ammonia can be switched to ammonium sulfate production simply by shutting down the decomposition chamber and ammonia section, and by adding sulfuric acid instead of ammonium bisulfate to the solution going to the absorber. The facilities for handling precipitated ammonium sulfate remain in operation and are the same for the two processes.

Pilot-plant experience at Inland Steel showed that the best material for the decomposition reactor is silicon-oil-coated graphite. The vessel is placed in a shell cast from a high-alumina refractory. The latter has electrical resistance heaters cast into its walls. Remainder of the equipment is of conventional design.

What's Behind It: The new development is strictly a matter of economics. For the last 30-40 years, coke-oven producers have been absorbing ammonia from coke-oven gases with sulfuric acid, and marketing the by-product ammonuim sulfate as fertilizer. However, the rise of synthetic ammonia (*CW, April 9, p. 65*) has resulted in depressed ammonium sulfate markets.

Although the Inland process offers an improvement to existing coke-oven operations, it certainly won't open up a major new source of anhydrous ammonia. Metallurgical coke ovens yield only about 3 lbs. of natural ammonia for each ton of pig iron, equivalent to 120,000 tons/year of ammonia from the nation's total pig iron production of about 90 million tons. Total U.S. ammonia capacity is now over the 5-million-tons mark.

However, coke-oven gas, which contains about one-third methane and two-thirds hydrogen, is an excellent source material for synthetic ammonia and is currently used for this purpose (*CW, Nov. 28, '59, p. 117; April 9, p. 65*). It may be that other steel companies that gain experience handling by-product anhydrous ammonia will move into synthetic ammonia production.

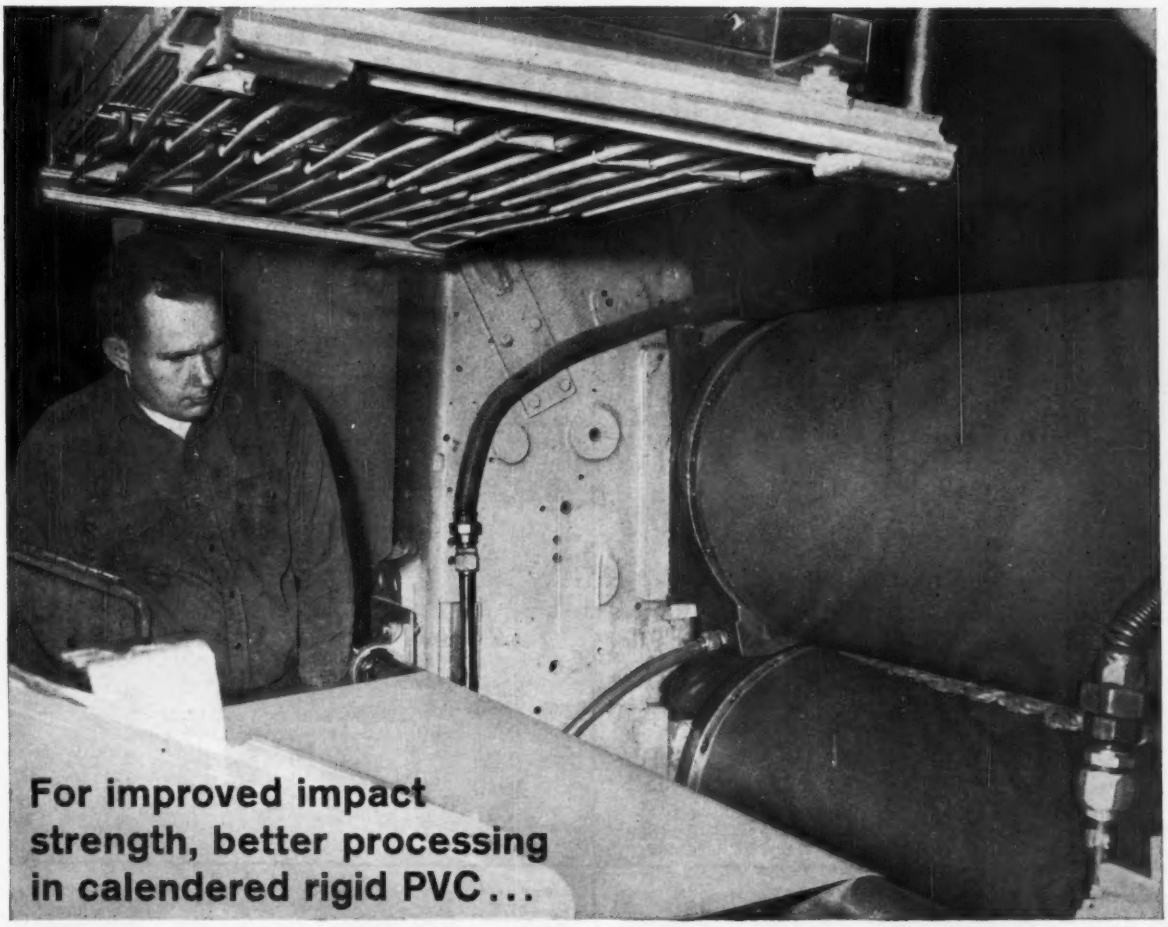


Photo courtesy Seiberling Rubber Co., Plastics Division

ACRYLOID KM-227

Increased impact strength and improved processing characteristics . . . you can have both in your calendered rigid PVC, by adding a single modifier—ACRYLOID KM-227. It's excellent for producing calendered sheet for items such as lamp shades, credit cards, simulated-brick wall sheeting, and translucent panels for lighting fixtures. Even when present at low concentrations in rigid vinyls, this acrylic resin contributes notable improvements in impact strength. Higher concentrations boost impact strength at a very sharp rate.

Processing improvement with ACRYLOID KM-227 begins right on the mill, where you get...a smoother-rolling bank . . . better mixing action because of a more rapid turnover of material coming in contact with the hot rolls . . . better dispersion of added ingredients and thus more complete homogeneity in your compound. More benefits follow in forming operations . . . in calendering you can have faster machine speeds and less plating . . . in extrusion, better surface qualities . . . in vacuum forming, better flow into the small crevices of intricate molds. And what's more, prolonged processing cycles have insignificant effects on the impact strength imparted by ACRYLOID KM-227. Write for technical bulletins giving detailed performance data on compounds modified with ACRYLOID KM-227. Also, inquire about ACRYLOID K-120, another modifier that works wonders in providing better processing.

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THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Get Sodium Bicarbonate in the grain size you need every time...

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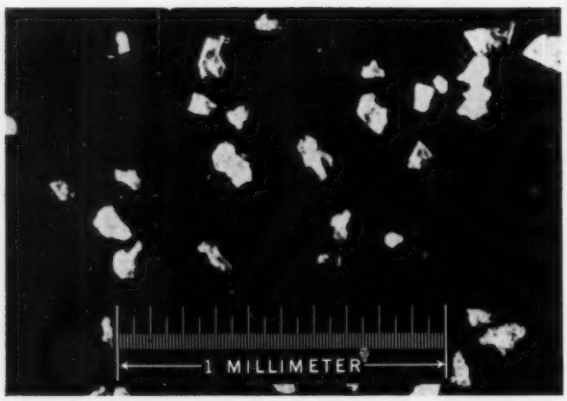
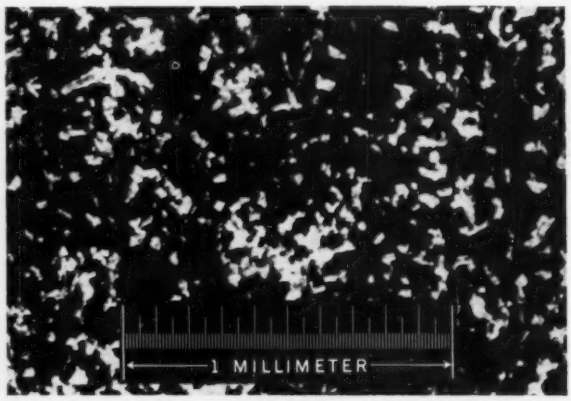


Sodium Bicarbonate U.S.P. Powdered No. 1—For general purpose use in chemical processing, dyestuffs, adhesives, starches, textiles and industrial applications.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

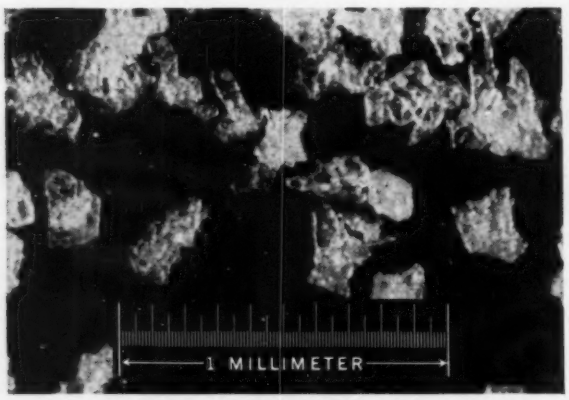
42 Mesh	Trace	200 Mesh	35.0%
100 Mesh	5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%



Sodium Bicarbonate U.S.P. Fine Powdered No. 3DF for use specifically in dry powder fire extinguisher mixes, also in rubber and plastics blowing, lubricant for sheet vinyl.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

170 Mesh	Trace	325 Mesh	25.0%
200 Mesh	2.0%	400 Mesh	45.0%



Sodium Bicarbonate U.S.P. Granular No. 5 for use in effervescent salts, other pharmaceuticals and special types of cleansers.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh	Trace	100 Mesh	92.5%
65 Mesh	27.0%	170 Mesh	99.0%
80 Mesh	66.5%		

Sodium Bicarbonate U.S.P. Treated Free-Flowing for use in fire extinguishers and sponge rubber.

TYPICAL SCREEN ANALYSIS
CUMULATIVE PERCENT RETAINED BY

42 Mesh	Trace	200 Mesh	35.0%
100 Mesh	5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%

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Market Newsletter

CHEMICAL WEEK
April 16, 1960

Stanford Research Institute this week opened its new ammonia survey (*CW, April 9, p. 65*) a little wider to reveal results of its recently completed synthetic ammonia capacity count. Here's how U.S. capacity added up, Jan. 1, in various census regions:

	Capacity Million tons NH_3/year	Percent U.S. total
New England	43.8	0.8
Middle Atlantic	262.0	5.0
South Atlantic	896.7	17.1
East North Central	724.0	13.8
West North Central	520.0	9.9
East South Central	549.0	10.5
West South Central	1,469.0	28.1
Mountain	103.0	2.0
Pacific	664.7	12.8
Totals	5,232.2	100.0

Additional synthetic ammonia capacity, says SRI, is on the way: three firms have revealed plans to start construction of additional facilities in '60-'61.

Dow Chemical will expand its Freeport, Tex., plant to 115,000 short tons/year of anhydrous ammonia, and also will construct a new plant at Plaquemine, La., with rated capacity of 50,000 short tons/year.

Tennessee Corp. will put up a plant at East Tampa, Fla., with capacity of over 100,000 tons/year; Solar Nitrogen Chemicals will increase capacity of its Lima, O., plant by 25,000 tons/year.

•

Microcrystalline wax production is under way at Shell Chemical's (England) Stanlow refinery; the 140/145 F wax has heretofore been available in England only from U.S. sources.

Shell claims that its product's quality is comparable to that of U.S. products of similar grades, will sell the wax to packaging industries.

•

Russian purchases of rubber from international markets may help strengthen world rubber prices in the near future, according to London observers.

Russia so far this year has held off buying in world markets—probably because it has had plenty on hand, as evidenced by unloading of stockpiled rubber during first-quarter '60.

But it's now reported that Russia is buying 3,000 long tons of U.K. government stockpile material for immediate shipment. The British

Board of Trade says it can't comment on the deal, but belief is that Russia will start buying extensively in London and Singapore.

Russian buying has been a significant factor in strengthening world rubber prices; despite U.K. and U.S. stockpile releases, spot price of rubber has continued to rise in '60. New interest by Russia will add another bullish element to the market.

•

Prices of potash have been hiked, as predicted earlier this year *(CW Market Newsletter, Jan. 2).* U.S. Borax & Chemical this week posted a $1.80/ton increase on all agricultural grades, effective July 1.

U.S. Borax President James Gerstley said in January that, because of contract provisions, low prices would have to continue until June 30, after which there would be a price improvement. In fact, some price increases in July '60 were predicted almost a year ago *(CW, July 11, '59, p. 87).*

•

Montecatini has started up its 12-million-lbs./year polypropylene staple fiber plant at Terni, Italy. A capacity increase to 60 million lbs./year may come by '62.

•

Latest indicator of the CPI's swing to barge commerce *(CW, April 16, p. 120):* a just-signed contract between barge-builder Reynolds Metals Co. (Richmond, Va.) and inland waterways carrier National Marine Service calls for the construction of "the world's two largest" aluminum barges. The barges will carry liquids.

National Marine's President David Wright says the barges will greatly simplify shipment of certain difficult-to-handle liquid chemicals. Included in this category: alcohols, detergents and jet aviation fuel. National Marine maintains water transportation facilities on the Mississippi and Ohio river systems, the Great Lakes, and Gulf and East Coast waterways.

•

A new, 2-million-lbs./year hexachlorobenzene plant has been put onstream at Kearney, N.J., by Standard Chlorine Chemical. SCC's President A. Weiner says the plant will turn out enough of the intermediate to handle all current industry requirements.

•

Catalin Corp. has completed expansion of antioxidant capacity; its 40% boost increases potential output to about 6 million lbs./year.

Among products whose production has been increased is butylated hydroxy toluene, widely used by food processors to control rancidity and discoloration. The expansion will also boost the output of 2,6-ditertiary butyl *p*-cresol; major applications include use as an additive in aircraft and automotive gasolines, jet fuels, other oil and petroleum products and rubber.

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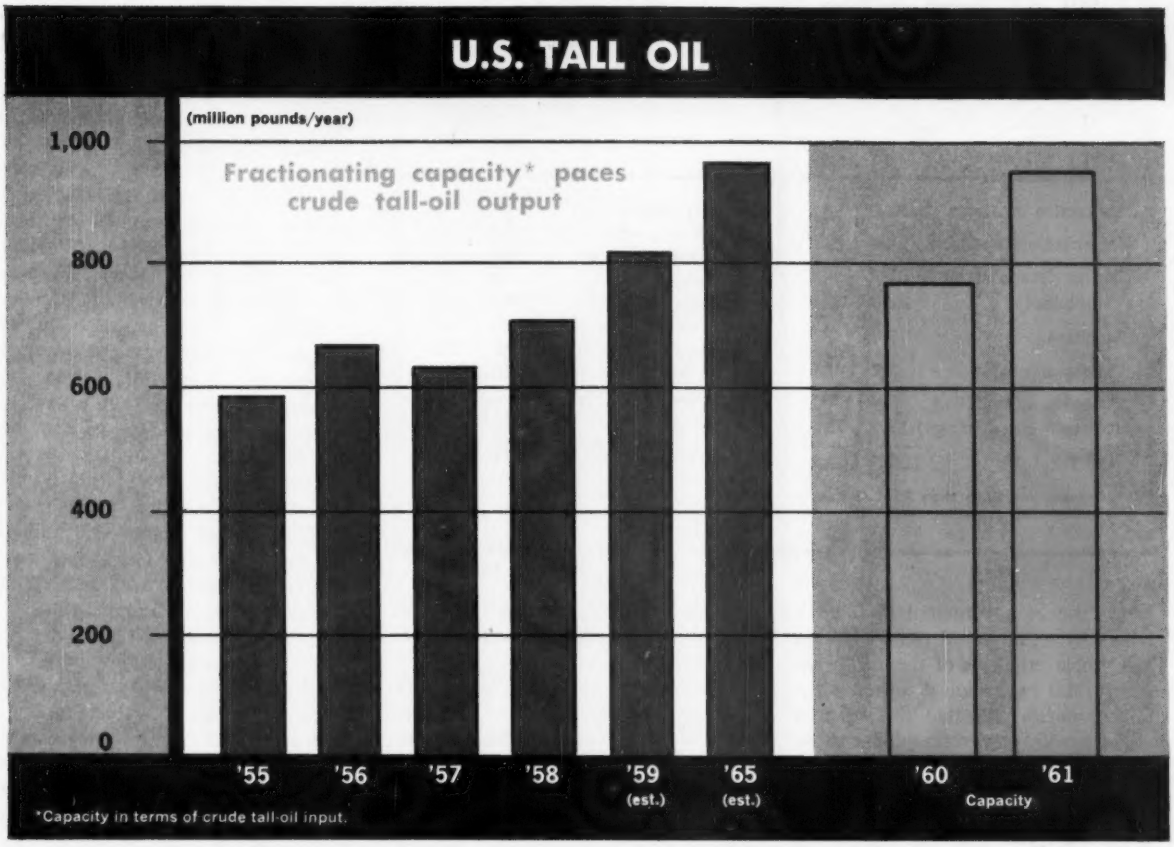


Tall-Oil Makers Bid for New Markets

U.S. tall-oil fractionating capacity will climb close to the billion-pounds/-year level by the end of '60, marking a decade of steady growth that began in '50 with one plant of 60-million-lbs./year capacity.

The industry's second decade now looks at least as promising as the first, although producers face some serious problems: (1) roughly 18% overcapacity; (2) a real need to spur greater domestic use of tall-oil fatty acids and rosin; (3) the looming threat of serious cutbacks in overseas sales because of proposed new tariff rates in the European "Common Market."

Capacity Boost: The '59 U.S. tall-oil fractionating capacity was about 764 million lbs./year, measured in crude input. Because of units added by Arizona Chemical, Hercules Powder and Heyden Newport, total capacity will increase to 950 million lbs./year by '61 (*table, p. 112*).

Although fractionating capacity appears to be well in step with availability of crude tall oil (*chart, above*), the sizable overcapacity of 18% exists because not all crude tall oil is fractionated—some is consumed in commercial applications in its raw state.

Demand for tall-oil fractionation products is picking up steadily; output of tall-oil fatty acids has climbed from 5 million lbs. in '50 to an estimated 149.6 million in '59, is expected to reach 211.2 million in '65 and 277.5 million lbs./year by '70.

But demand for the fatty acids isn't increasing fast enough to satisfy producers most hampered by continuing overcapacity. To remedy the situation, U.S. tall-oil producers—working largely through the Pulp Chemicals Assn.—hope to stimulate broader use of inexpensive tall-oil fatty acids and rosin. Many potential users, said one observer, "seem not yet to have discovered these low-priced raw materials."

For example, PCA will soon sponsor a research program on tall-oil rosin. The work will be done by the U.S. Dept. of Agriculture's Research Service at the Southern Utilization Research and Development Division's Naval Stores Station at Olustee, Fla.

Object: to find a way to quantitatively determine amounts of rosin in maleic-modified alkyds (methods for nonmodified alkyds have been developed). Point is that government specifications prohibit presence of any rosin in such materials—and, though not bound by these regulations, many industrial alkyds producers (foreign as well as U.S.) follow the specs. If analytical methods are successfully developed, it means that tolerance limits can be set, blanket prohibition of all rosin contents can be eliminated.

Gum rosin producers at first op-

'59 U.S. consumption of tall-oil fatty acids*

	(million pounds)	(% total)
Protective coatings	31.9	30
Intermediate chemicals	24.4	23
Soaps, detergents, disinfectants	22.3	20.9
Flotation	7.7	7.2
Tallate driers	2.2	2.1
Other uses (including hard floor coverings)	17.9	16.8
Total	106.4	100.0

*Accounts for more than 95% U.S. consumption, not including exports.

U.S. tall-oil fractionating capacity

Company	(million pounds/year crude tall-oil input) Capacity Now	1960-61
Arizona Chemical	140	220
Bell & Gossett	20	20
Crosby Chemicals	120	120
Glidden Co.	48	48
Hercules Powder	152	200
Monsanto-Emery	80	80
Heyden Newport	72	130
Union Bag-Camp Paper	100	100
West Virginia Pulp and Paper	32	32
Total	764	950

posed use of government facilities—originally set up to aid gum producers—to solve problems of the tall-oil industry. But opposition dissolved when it became obvious that the research could benefit gum rosin producers as well. Moreover, increased tall-oil rosin output isn't now much of a threat to the supply-strapped gum and wood rosin industry; expected decline in wood rosin output won't be offset by likely increases in output of tall-oil rosin (*CW, March 5, p. 73*).

Tariff Cuts? Contrary to thinking in many other areas of the chemical process industries, U.S. tall-oil producers are prepared to suggest cuts of import duties on tall-oil products; although this would open the door wider for competitive foreign-produced materials, U.S. producers would stand to gain from such trade liberalization if cuts in duties are reciprocal.

Crux of the trade problem—which inspires the liberal thinking—is detailed by the Pulp Chemicals Assn. (in behalf of its membership) in a statement to the U.S. Committee for Reciprocity Information and to the U.S. Dept. of Commerce. It concerns proposed negotiations to be conducted this year, at Geneva, under the General Agreement on Tariffs and Trade (GATT).

Cause for concern is an overseas proposal that tariffs (on tall-oil products) in countries participating in the European "Common Market" be adjusted to a common level. Such a move would result in a "severe price disadvantage" to U.S. tall-oil producers, says PCA.

U.S. exports of tall-oil fatty acids to West Germany, Belgium, Netherlands and Italy totaled some 5.93 million lbs. in '57, hit a peak of 9.38 million in '58, dropped off to 5.95 million in '59. The current market was won in face of duties ranging from 5 to 13½%.

In the exceptionally good year of '58, U.S. exports of the fatty acids to these countries represented about 8% of total U.S. output of 112 million lbs.

But because of existing duties, development of the foreign markets has been slow; although the proposed 8% duty for all countries is lower than some current rates, U.S. producers hope to bargain for still lower levels. One argument: an increase of 3% in the case of Benelux nations and Italy would prevent further expansion and would probably weaken or destroy the current market, say U.S. spokesmen.

Elimination of all foreign duties—in any case, strong opposition to any increases—is urged for refined and distilled tall oil. Current duties are 7% in Italy, 9% in West Germany, 13½% in France; although Benelux countries have no duty on these materials, the markets there are declining.

Biggest buyer of U.S.-made refined and distilled tall oils in '59 was Italy, which took almost 6 million lbs.—a small order, in contrast with more than 11.6 million purchased in '57. Amounts taken by others in '59: West Germany, 269,860 lbs.; Belgium, 167,615; Netherlands, 633,764—also declining markets.

Proposed general duty on rosin (including gum, wood, and tall-oil rosins) is 6%; this compares with the current 15% level in France, 8% in Italy and none in West Germany and Benelux countries.

These countries—with exception of France—must import rosin. U.S. producers, who provide the major portion, consider proposed increased duties (i.e., for West Germany and Benelux) as a tax that will not justify protection for France, which has been unable to supply enough rosin for its own requirements.

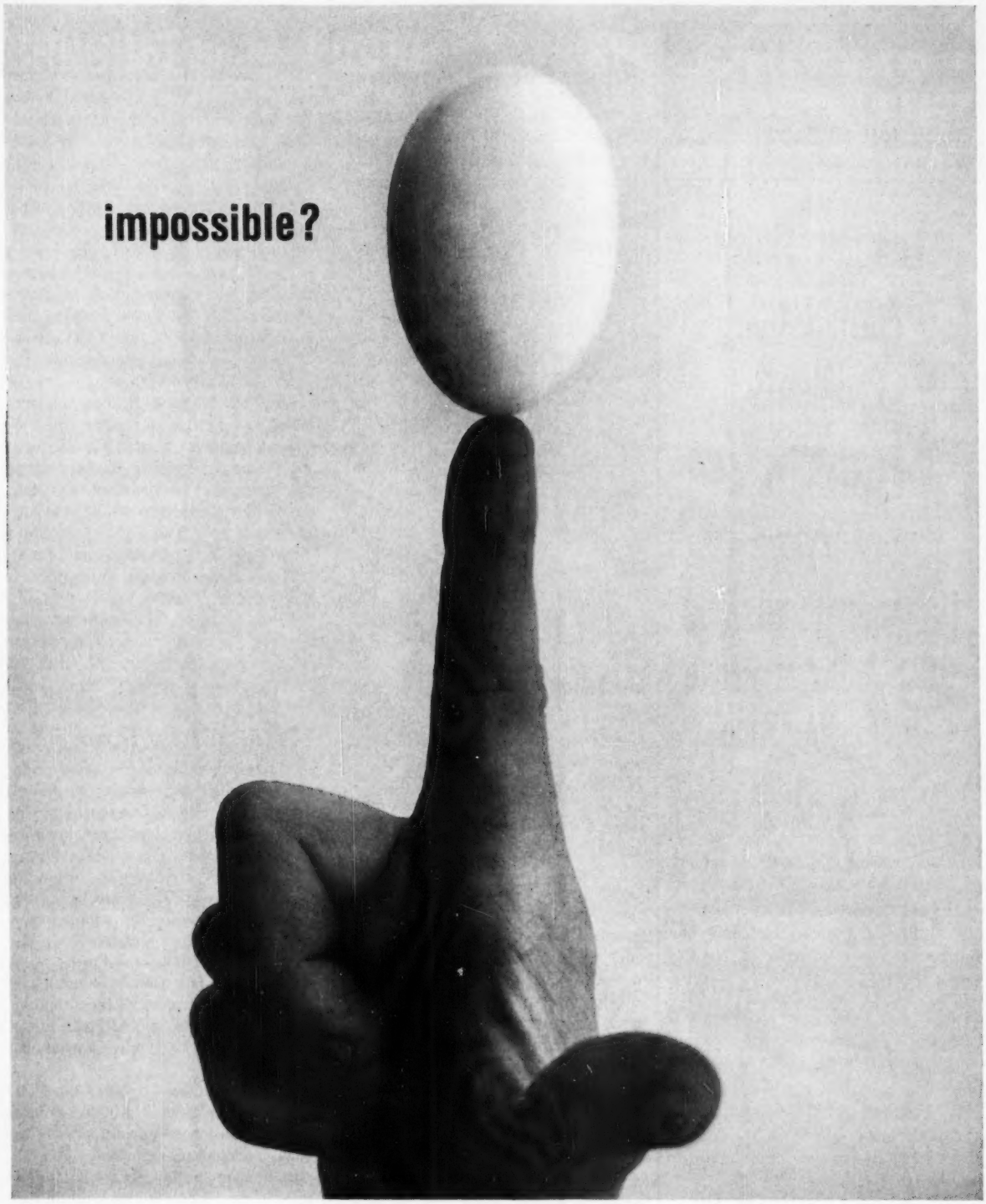
European rosin buyers lean heavily in favor of gum and wood rosin; purchases in '59 totaled 39.8 million lbs. of gum rosin, almost 80.4 million lbs. of wood rosin and about 8.3 million lbs. of tall-oil rosin.

Basic argument—as pinpointed by PCA—is that none of the nations of the European Economic Community produces competing products in sufficient volume for needs of the group as a whole. Under existing import controls and tariffs, the U.S. has been able to fill the gap between European production and consumption of tall-oil products; proposed tariffs, it's believed, would seriously curtail U.S. sales to EEC.

Consumption of tall-oil fatty acids in western Europe hasn't paced growth in the U.S., says PCA. Slower growth overseas is attributed primarily to tariff and trade restrictions on these products whereas competing products—such as linseed oil, soybean oil and their seeds — have felt few restrictions.

Consequently, U.S. tall-oil producers are considering recommending reduction of U.S. duties on imports of the product as a "possible bargaining weapon." The concession, it's argued, would pose no serious threat of injury to the domestic market because continued expansion of export markets would more than offset losses suffered through liberalization of U.S. import duties.

While U.S. tall-oil makers' problems are obviously knotty—toughest may be their fight to maintain export markets—the over-all outlook for the industry is bright.



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Japan Pushes Acrylo

Japan's CPI is heading toward an acrylonitrile boom. During the past few weeks a half-dozen Japanese textile producers have requested government permission to sign technical licensing agreements with foreign firms for production of acrylonitrile yarn. It's part of a current Japanese drive to move toward up-to-date synthetic fibers to sustain their overseas textile and garment markets.

Acrylo to Glutamate: Demand for acrylonitrile in Japan will also be boosted by other users. For example, Ajinomoto, Japan's leading manufacturer of food seasonings, says it is switching to acrylonitrile as raw material for manufacture of monosodium glutamate (Ajinomoto).

Initial pilot-plant operations have proved successful, and the firm will start a switchover from wheat to petroleum-derived acrylonitrile as raw material. Initial plans call for a 300-tons/month output by '62.

Sad Saga for Soy

Soybean oil is now a "drug on the market" because U.S. production has greatly outstripped demand. Result: an estimated 25% of U.S. oil processing capacity is shut down, prices have ebbed to an all-time low. And little relief is in sight.

Spokesmen for General Mills recently outlined these woes of the industry, pointed out another: despite overabundance of soybean oil, excess can't be disposed of through sales to world markets because government supports are too high. On the other hand, soybean crushers can get rid of meal fairly easily, although not very profitably. Result: an annual imbalance of oil equivalent to some 100 million bu. of soybeans.

Some crushing plants reportedly are losing up to 18¢/bu. on recent crushings. General Mills has shut down its Toledo plant and is now buying oil for its own needs. Five other plants in Ohio have stopped buying beans, are said to have enough inventories to last through the summer.

Soy Price Slide: Price of soybean oil has skidded to a low 7½¢/lb. from a high of 15¾¢/lb. in '56; and profit margins "are the lowest I can remember," one producer told CHEMICAL WEEK. He pointed out that the 7.5¢/lb. price wouldn't be too bad if profit on meal was better —if meal sold for around $60/ton instead of the current $50/ton.

Only answer, says Fred Hafner, director of General Mills' protein operations, is to cut back on production of soybeans or start government subsidies of meal and oil (the government now supports only beans). However, Washington is cold to the soybean problem; last year there was a big bean giveaway program abroad —but none in '60, so far.

Research Pushed: A more distant —but more basic—answer to the soy oil problem may come from a new research program outlined at a recent annual conference of the Chemurgic Council by M. D. McVay of Cargill, Inc. Said McVay: the Soybean Council of America—an organization of growers and processors—has pledged $50,000 to the recently formed Soybean Oil Research Conference; Chemurgic Council members were urged to support the plan to "open a vast new market" for soy oil.

Metals Show Strength

Metals are showing continued price strength. In fact prices of many metals have risen in London.

For example, zinc prices in London have increased steadily despite government stockpile disposal plans disclosed in late February; but in face of rising world consumption, the supply position—hence future prices— will remain uncertain for some time.

Lead, too, has been steadier in recent weeks. International consumption is up, and prices should hold fairly firm, so long as supply restrictions remain firm.

However, there's some question about copper prices. London prices recently have been appreciably above New York levels—the differential is attributed to the low level of London stocks, plus speculative pressure in the U.S.

But the copper market is believed to be adjusting to "normal" conditions following the end of U.S. strikes. The situation is extremely sensitive and prices could react sharply to potential supply disruptions. For example the recent South African racial crisis resulted in prices moving up after they had suffered a temporary setback.

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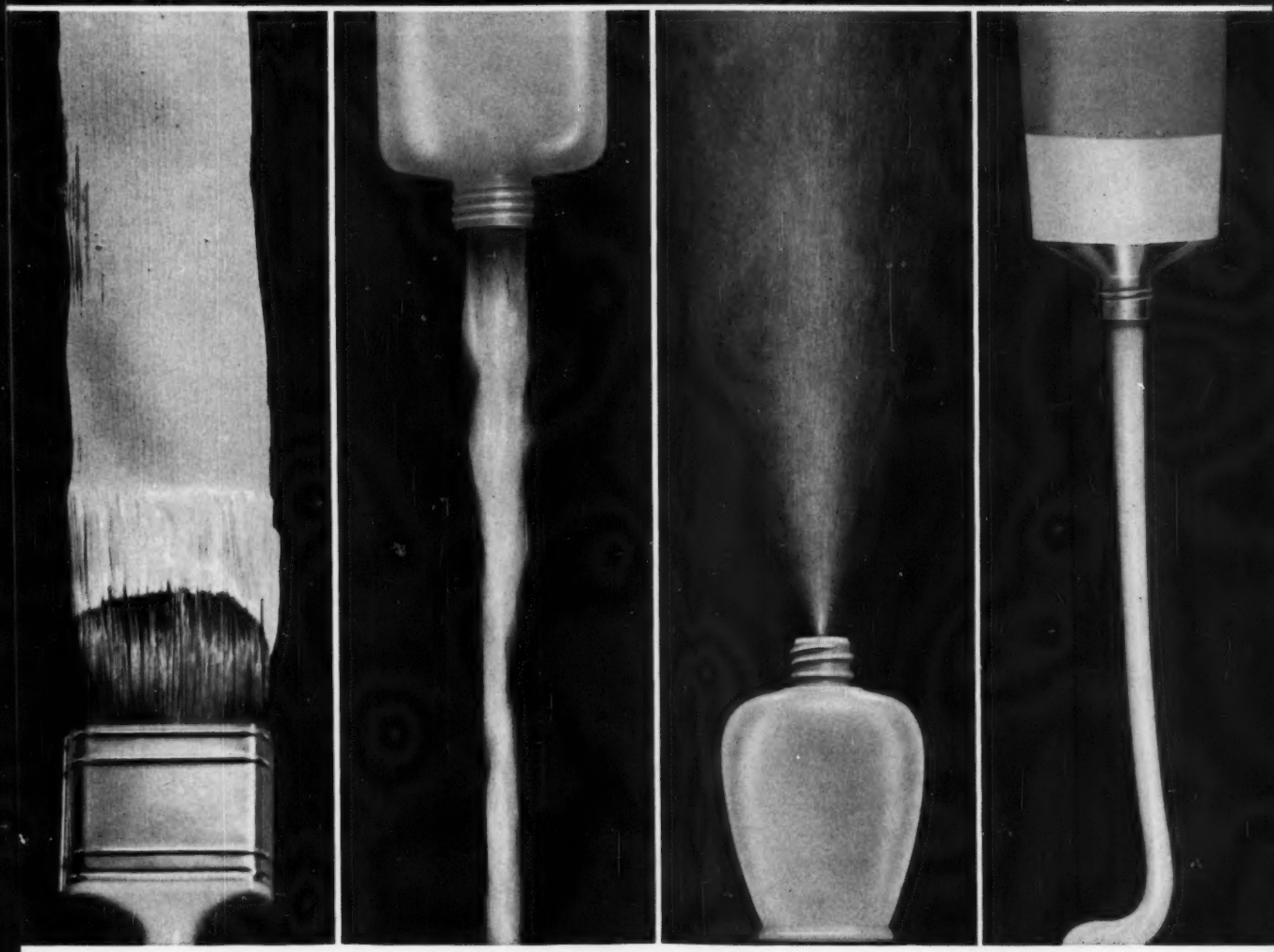

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Package makers, users compare notes, see vigorous cellophane-polyethylene battle ahead.

Packaging Experts Agree: Market

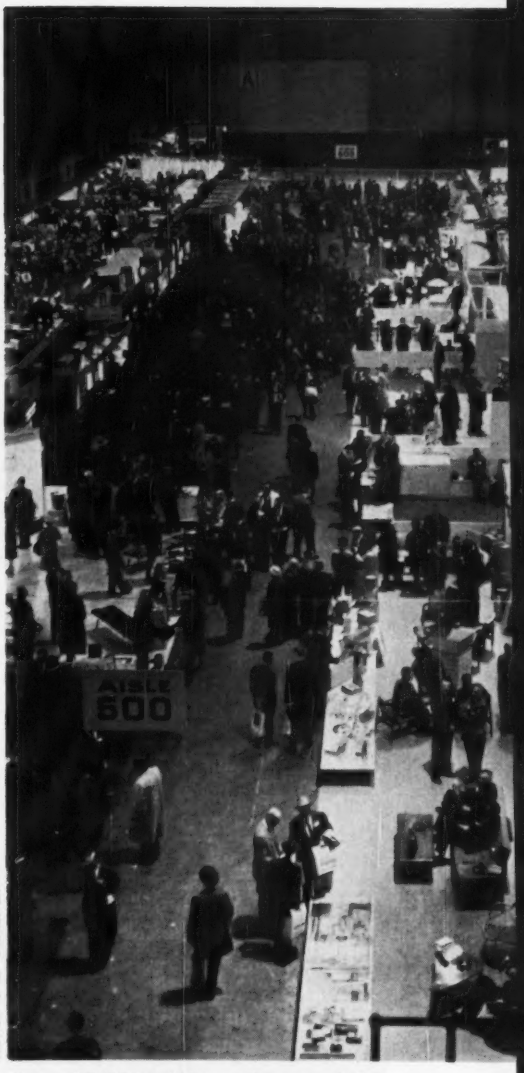
Cellophane and polyethylene film makers are girding for a showdown battle. At stake: the lion's share of the $1-billion/year flexible packaging-materials market. Upshot for chemical process industries companies: better and cheaper packaging materials, more attention from packaging designers, sharply increased sales of chemicals and plastics for use in packaging.

This was the conclusion of packaging experts attending the huge National Packaging Exposition last week in rainswept Atlantic City, N.J. Sponsored by the American Management Assn., the exposition featured colorful displays by film and resin producers, converters and equipment manufacturers. They all served to point up the major battleground for film marketers: overwrapping applications, particularly for foods, that can be done automatically. Goal is to speed up the packaging step, cut costs.

Key to success in the dynamic overwrapping business lies in films with high clarity and gloss (for consumer appeal), low cost (both in the film itself, and in fast machine wrapping), and reasonably good strength. Previously, cellophane dominated this market. But improved film-grade polyethylene resins developed by major producers now threaten to cut deeply into traditional cellophane markets.

New clarity sparks polyethylene's bid for packaging jobs.

"Poly" film toughness also gets close attention.



CW PHOTOS—W. E. VECCHIO

Over 25,000 visitors thronged the big four-day show at Atlantic City.

Battle Stiffening for Film Makers

Last year, 330 million lbs. of polyethylene resin were extruded into film. Nearly 250 million lbs. of it went into packaging applications. Polyethylene marketing men expect packaging applications to consume 300 million lbs. this year, 400 million lbs. by '63, 650 million lbs. by '65.

Projected growth rates for polyethylene used for automatic overwrapping are even greater. Plastics market researchers figure that some 3 million lbs. of polyethylene went into bread wrapping (biggest volume use for automatic overwraps) in '58, about 5 million lbs. last year. But newly developed resins and specially designed overwrapping equipment will boost these volumes to 20 million lbs. by '62. And they'll spur a 20-fold growth by '65, say Union Carbide sales planners.

'Poly' on the Move: Polyethylene producers, long bothered by excess production capacities (*CW, March 5, p. 87*), are working hard to develop better resins to satisfy these potential high-volume customers. Results of their intense efforts were evident at the exposition. Example: new resins that yield films with greater clarity, improved physical properties, broader heat-seal ranges.

Union Carbide Plastics unveiled a new series of resins (DFD 0350) that can be extruded into films possessing

PACKAGING SHOW HIGHLIGHTS

In addition to signs of a stepped-up battle between cellophane and polyethylene film makers, CHEMICAL WEEK uncovered these significant developments at the Packaging Exposition:

Vexar Plastic Netting

Du Pont's Film Dept. displayed an extruded polyethylene netting, available in fine or heavy gauges. Possible uses: produce bags, industrial meshes.

Stretchable Paper

Scott Paper Co. (Chester, Pa.) demonstrated its entry in the stretchable paper field. The paper, named Expanda-Kraft, reportedly has five times the machine-direction stretch of ordinary kraft.

Scented Polyethylene

Allied Chemical Corp. and U.S. Industrial Chemicals Co. separately introduced polyethylene films scented with various aromas. Among them: orange, chocolate, clean linen, fresh bread.

Foil Drug Packages

Ekco-Alcoa Containers, Inc. (New York) displayed small, hermetically sealed aluminum foil containers that it plans to promote for drug and chemical packaging.

Heavy-Duty Shipping Bags

W. R. Grace & Co. unveiled a new polyethylene resin (Grex 2201) suitable for production of heavy-duty plastic shipping sacks (*CW, Feb. 20, p. 35*).

Polyethylene Multipacks

Du Pont's Polychemicals Dept. introduced the polyethylene multipack, an arrangement of several jars, bottles or cans bound with a band of shrinkable polyethylene. The band is applied loosely over the units, drawn down tightly by brief exposure to 300 F.

Military Packaging Code

The U.S. Defense Dept. showed a new code system for military packaging materials. Named MIL-STD-726, the new code uses 26 digits to convey detailed specifications on military packaging.

excellent clarity and gloss; and with better physical properties (tensile and impact strength) than the company's previous film-grade resins. Carbide also showed its recently introduced DFD 0600 series resins that yield films with extremely good physical properties, but have poorer optical properties than the 0350 resins.

Monsanto Chemical Co. introduced its newest candidate for automatic overwrap jobs, tabbed it polyethylene 31.

And U.S. Industrial Chemicals Co. (division of National Distillers Corp.) took advantage of the exposition to disclose development of its new film-grade resin (Petrothene 112) that features high clarity and gloss.

Film Progress: But new resins weren't the only advances displayed at the show. Dow Chemical Co. revealed that it soon will be distributing polyethylene film, named Polyfilm, throughout the country via Dow and Dobeckmun sales staffs (*CW Market Newsletter, April 9*).

And Du Pont's Film Dept. showed off its recently unveiled "high-clarity, high-impact" film.

Cellophane Counters: But cellophane marketing men were in top form at the exposition, unveiled a few surprises of their own. All were designed to hold the lead they have enjoyed for years in automatic overwrapping applications.

Du Pont's Film Dept. revealed its newest cellophane, MSD-60, a regular-priced film (62¢/lb.) that seals at 250 F, some 50 degrees below other cellophanes. Du Pont pointed out that the new film permits users to speed up sealing operations, in some cases to 10%, cutting wrapping costs.

Film Dept. marketers explained that some other Du Pont cellophanes soon will be available in forms that seal at these lower temperatures.

Du Pont also noted that its polymer-coated cellophanes (K series) are enjoying a sales surge of more than 155% during last two years.

American Viscose Corp. demonstrated the merits of its cellophanes in retail packaging uses, showed a group of multiple-unit packaging ideas highlighting the clarity and printability of cellophane.

Cellophane Markets: Doubtless, polyethylene film sales for packaging are mounting; and most film makers realize that cellophane faces stiffer competition from better polyethylene resins, improved film fabrication techniques, faster wrapping and handling operations.

Robert R. Smith, sales director for Du Pont's Film Dept., predicted at the exposition that cellophane markets will grow from the current 436 million lbs./year to about 600 million lbs. by '70—a 40% jump.

Moreover, some cellophane marketers told CHEMICAL WEEK that the aggressive competition of polyethylene makers has forced them out of their traditionally reserved marketing approach.

Others pointed out that despite increased use of polyethylene film (poly grew from 10% of the flexible-packaging market in '58 to 12% last year), cellophane also registered a gain (from 25 to 27% of the market) in '59. Other transparent films accounted for 3% of the flexible-packaging-material market, just as it did in '58.

Other Films: Although cellophane and polyethylene together constitute nearly 40% of the total flexible-packaging market, other films attracted attention at the exposition, will likely offer serious competition to the two "kingpins" in some applications.

Goodyear Tire and Rubber Co., for example, reported record first-quarter sales of its Pliofilm, Vitafilm F, and Videne TC packaging films. It looks for '60 to set new highs in sales volumes (*CW Market Newsletter, April 9*).

And polypropylene film was shown by AviSun and Enjay. Major sales point: easy handling of the new film in multifold seals.

Spencer Chemical Co. said it will begin full-scale marketing of its Poly-Pro polypropylene resin for packaging uses soon, predicted such uses will consume 5 million lbs. of resin in '60, may jump to 15 million lbs. by '61, 55 million by '63.

Ahead for Films: Through the '50s, flexible packaging was the fastest-growing segment of the many-faceted packaging industry. Today, film producers look ahead with unguarded optimism toward burgeoning demands for films in a myriad of applications. But, if current estimates of cellophane and polyethylene sales prove accurate, polyethylene could displace cellophane as the top-selling packaging film in the late '60s.

SILICONE NEWS from Dow Corning

Stuck With High Costs?

On Consumer Products . . . Syl-off coated papers mean more satisfied customers. As backing for self-adhering wallpaper, decorative trim, labels, or other pressure sensitive items, Syl-off coated papers peel free with ease . . . prevent tearing the item when the backing is removed . . . and have no effect on the pressure-sensitive characteristics. As wrapping or interleaving for foods, or as pan liners for sticky candies and baked sweet goods, Syl-off coated papers leave no bits of wrapper clinging.

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There are other important features besides controlled stick-proofness. For example, Syl-off coated papers have a natural non-oily lubricity. Water repellency is still another silicone feature imparted by Syl-off. Syl-off silicone coatings are also readily applied to foil or plastic film — impart the same desirable characteristics as they do to kraft, glassine, parchment and paperboard.

Best way to find out what type Syl-off coated paper can help you most is to get in touch with the fine houses that offer papers or containers with Syl-off coatings. Write to Dow Corning for the complete list of Approved Sources plus an informational brochure describing Syl-off paper coatings. Do it today. Address Dept. 3304.

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Tax for Water Carriers?

Faced with the possibility of paying user charges (CW, March 26, p. 91), the nation's inland waterway operators and their supporters last week were hitting back. They have built a case designed to show that (1) U.S. industrial producers, including many chemical makers, are stepping up their use of barge transportation on inland waterways, but (2) total waterborne commerce continues to fall off, because "discriminatory factors at work in the transportation economy are abnormally depressing water-carrier traffic."

Their case:

Industry, including some 40 chemical process industries concerns, last year constructed or made plans for 317 new plants and other facilities along the nation's navigable inland waterways. This was 35% below the 488 built or planned in '58, according to a report by American Waterways Operators, Inc.

But while total waterside construction was off—part of a 25% drop in total industrial building—the construction of facilities for barge commerce showed a marked increase. Of the 317 waterside projects, 161 installations (51%) were terminals, docks, wharves and other facilities designed especially for handling barges. According to Braxton Carr, AWO president, this is the largest number of such terminal facilities erected in one year since AWO started keeping statistics in '52.

"It is significant," Carr said, ". . . because it indicates that more production industries are either turning to [barge commerce] or increasing their use of it."

Water Traffic Down: But despite greater use of barges, waterways proponents are disturbed over the continued decline in total domestic waterborne commerce including foreign, coastwise, Great Lakes, and inland waterways traffic). The total 1,048 million net tons moved was significantly below the '57 traffic load.

But of this traffic, inland water carriers moved 387 million net tons last year, almost 6% more than were transported in '58. (The record was 392 million tons, in '57.)

Inland waterways carriers, exclusive of those operating on the Great Lakes, handled 36.9% of total waterborne domestic traffic. In '58, inland

water traffic amounted to 36.4% of the slightly more than 1 billion tons of total water-borne commerce.

Against Excise Tax: Speaking out against the proposed user charges—which would take the form of fuel excise taxes on users of inland waterways, beginning with a period of low-level imposition—the Ohio Valley Improvement Assn., Inc., recently told President Eisenhower that the tax would have the same economic effect as a system of internal tariff barriers, which the Constitution forbids. "Like tariff barriers," said OVIA, "such a tax would tend to shrink the markets available to industry, defeat the economies of specialization in industry and agriculture, and regionalize trade, dividing the country into restricted provinces. . . ."

What effect would the proposed tax extension have on the chemical industry, specifically? The association said: "Operations of the petroleum industry based upon the waterways and of the rapidly expanding chemical and aluminum industries and many others would be gravely handicapped. Added transport-cost burdens would be compounded by automatic increases in electric power rates based on delivered costs of coal."

DATA DIGEST

• **Packaging Films:** Booklet describes properties, specifications and standards for variety of packaging films, including high-impact, bread overwrap and general types. Dept. K-P, Chippewa Plastics Co. (Chippewa Falls, Wis.).

• **Latex Thickeners:** Technical booklet discusses the properties and uses of latex thickening agents—viscosifiers—used in production of paper, asphalt, ceramics, drilling muds, cosmetics, binders for cushioning, and backing for rugs and upholstery. Subjects treated: stabilizing slurries, trapped air, comparing thickeners, mixing techniques, compounding temperatures, loading and viscosity. Alco Oil & Chemical Corp. (Trenton Ave. and William St., Philadelphia 34).

• **Multiwall Bag Aid:** Wallet-size reference table shows conversions of bags-per-minute to tons-per-hour. Table includes data for bags of 50-, 80 and 100-lb. capacities at fill rates from 1 to 30 per minute. St. Regis Paper Co. (New York).

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

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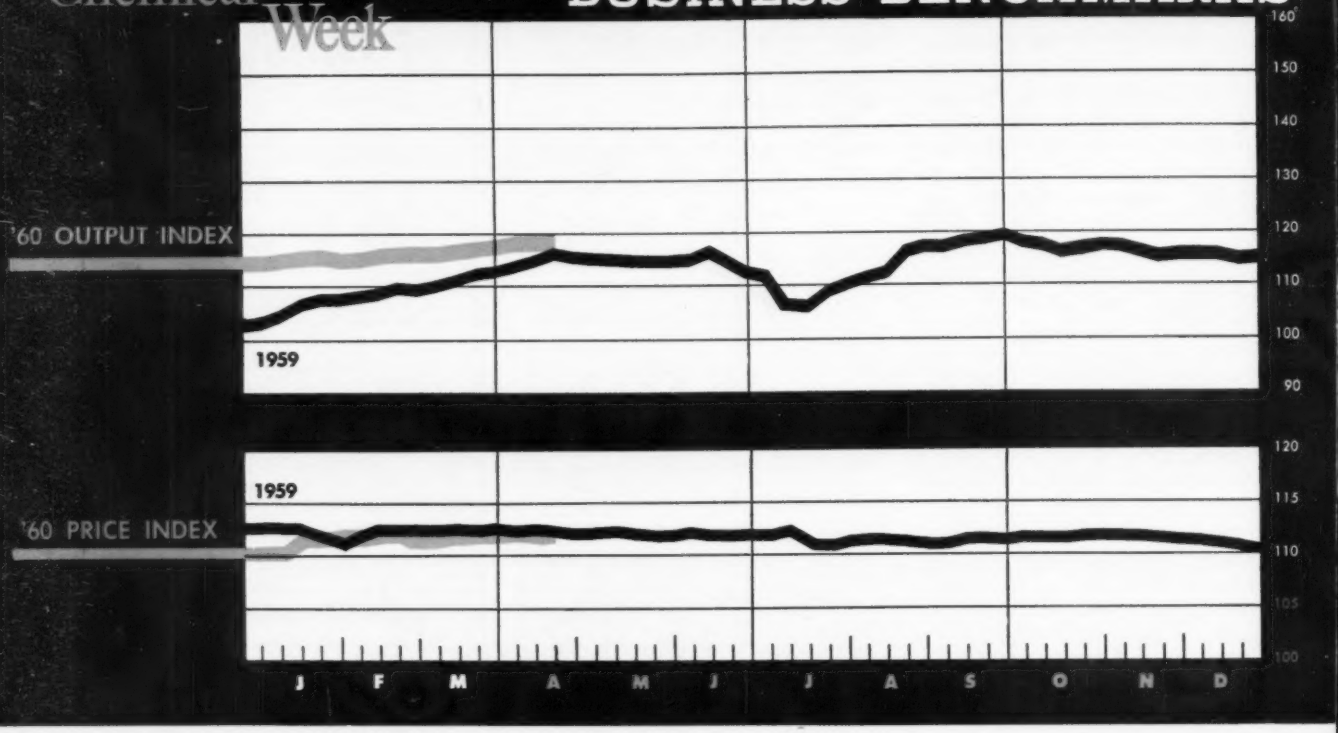

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WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1957=100)	118.9	118.4	115.6
Chemical Week wholesale price index (1947=100)	110.7	110.7	112.3
Stock price index (12 firms, Standard & Poor's)	53.31	53.07	52.25
Steel ingot output (thousand tons)	2,447	2,527	2,641
Electric power (million kilowatt-hours)	13,542	13,951	12,618
Crude oil and condensate (daily av., thousand bbls.)	7,150	7,078	7,130

FOREIGN TRADE INDICATORS (Thousand dollars)	EXPORTS			IMPORTS		
	Latest Month	*Preceding Month*	*Year Ago*	*Latest Month*	*Preceding Month*	*Year Ago*
Chemicals, total	132.7	152.4	115.2	24.5	34.1	23.7
Coal-tar products	11.8	13.1	9.4	4.7	7.4	5.9
Industrial chemicals	26.9	29.5	18.4	9.4	10.7	8.2
Medicinals and pharmaceuticals	22.0	25.2	22.2	2.0	2.1	1.7
Fertilizers and materials	7.7	12.4	8.2	6.7	11.4	6.2
Vegetable oils and fat (inedible)	8.5	6.4	8.6	6.0	7.2	5.6

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Philadelphia 3...William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

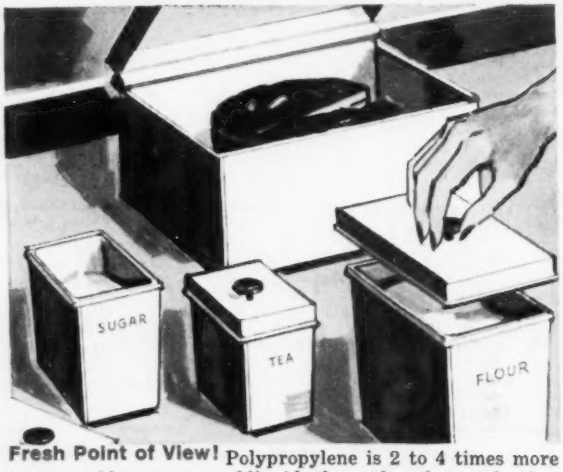
Pittsburgh 22.....Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg.,

San Francisco 4....William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8.....R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

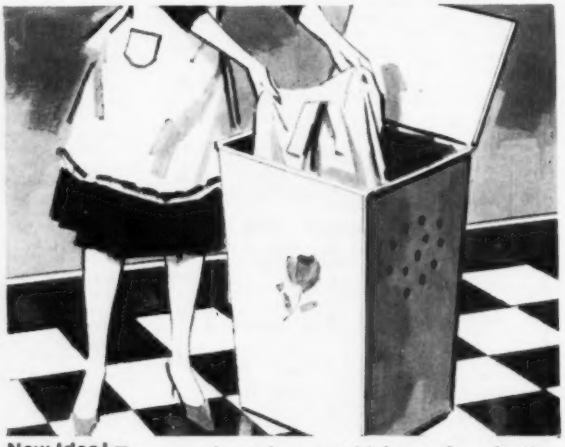
*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

Beats the Heat! Housewares made of Escon get repeated use without warpage. That's because the heat resistance of polypropylene is greater than any other polyolefin. This makes it the desired material for such items as colanders, drainboards, dishpans, tumblers and lighting grilles.



Fresh Point of View! Polypropylene is 2 to 4 times more impermeable to gases and liquids than other thermoplastics. This means freshness stays in, outside elements can't enter. This makes Escon ideal for canister sets, bread boxes and cookie jars—which can be snap-fitted or self-hinged.

Cool Item! Escon is excellent as a food crisper for several reasons. It won't absorb strong food odors and, when properly molded, has the ability to take normal cold without cracking. The design possibilities with versatile Escon are limitless, providing the opportunity to expand existing markets.



New Idea! Escon can be undercut at high speed production cycles. Such items as clothes hampers can be molded in single flat pieces of various colors, then snap-locked for assembly and hinging. This means manufacturers can ship more products in less space . . . retailers will use less storage space, too.

Escon* POLYPROPYLENE CATCHES HER

Important news for molders and designers . . . Escon polypropylene is here! It's the amazing thermoplastic ideally suited to your product needs.

Versatile Escon is easy to work with! It can be injection and compression molded, extruded, thermoformed and heat sealed. The injection molder can start at stock temperatures of 400-450°F., for small items . . . slightly higher for larger ones. In addition, gates and runners for Escon could be of the conventional type, and normal clamp pressures would be employed when molding it. And Escon molds easily—

EXCITING NEW PRODUCTS

ENJAY PLASTICS

ENJAY COMPANY, INC., *15 West 51st Street, New York 19, N.Y.*

EYE WITH NEW BEAUTY AND VERSATILITY

without warpage! Because of its low density, this amazing thermoplastic resin yields more pieces per pound.

For the designer, the high strength of Escon plus its excellent chemical and abrasion resistance allows accurate production of fine and intricate designs with high surface gloss.

And because polypropylene offers greater heat resistance than any other polyolefin, products manufactured from Escon can be readily sterilized by heat or chemical means. *Trademark

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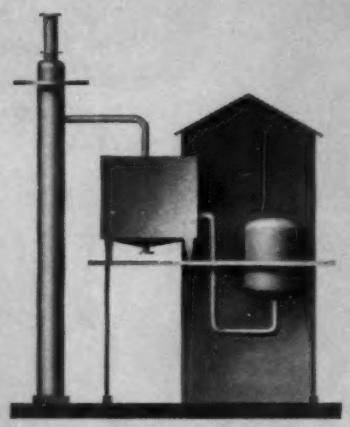
Escon can help you make a better product! For technical assistance or to order Escon, contact the nearest Enjay office.

ENJAY
PLASTICS

The pay-off is in production

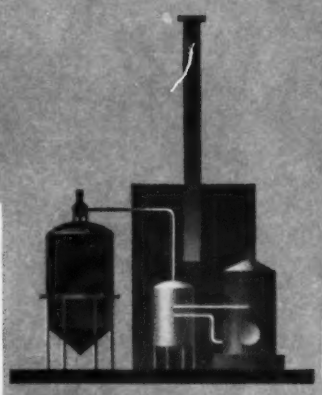
SD announces successful start-ups of 5 more plants

WITCO CHEMICAL COMPANY
Illinois



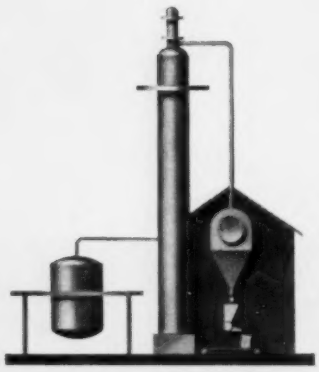
PHTHALIC ANHYDRIDE

CARY CHEMICALS, INC.
New Jersey



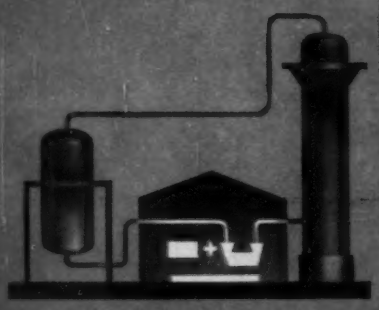
POLYVINYL CHLORIDE

AMERICAN CYANAMID COMPANY
Pennsylvania



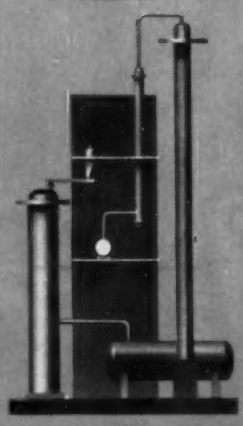
MALEIC ANHYDRIDE

MITSUBISHI PETROCHEMICAL COMPANY, LTD.
Japan



ETHYLENE OXIDE

BRITISH HYDROCARBON CHEMICALS, LTD.
Scotland



CUMENE

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